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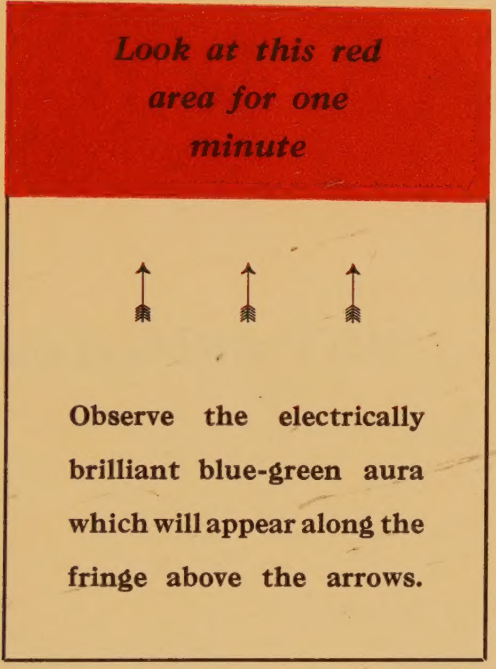
COLOR is a threefold force—physical, physiological and psychological.


Look at this red area for one minute
Observe the electrically brilliant blue-green aura which will appear along the fringe above the arrows.

THIS experiment illustrates one principle concerning the active force of color. The appearance of the blue-green has a physical and physiological basis; it has a bearing on the psychological effect of color.

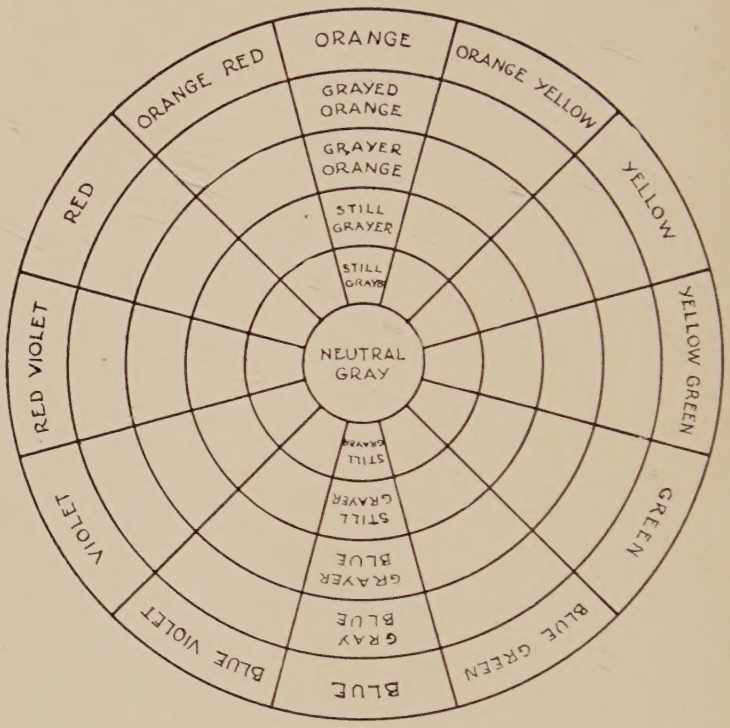
Seen as forces, the colors we use in home dress or business are working for us or against us. "Color in Everyday Life" is the standard work on the subject of the active properties of color and the related principles of color harmony.

See the inside of the back cover for the packet of colored slips which the reader is directed to use in the experimental study of the force of color.

COLOR IN EVERYDAY LIFE

PIGMENT MIXTURE

THE COLOR CIRCLE



To gray a color add the color which is opposite to it on the wheel. e.g. to gray orange add blue; to gray blue add orange. This represents pigment mixture, not the mixture of colored lights. Many of these grayed hues will look brownish. The grays which result from mixing violet and yellow will look like violet browns. Similarly red and green will give russet brown or olive brown. Blue and orange, with orange predominating, will give a golden brown.

Color in Everyday Life

A Manual for Lay Students, Artisans and Artists

On the Principles of Color Combination and Color Arrangement, and their Applications in Dress, Home, Business, the Theatre and Community Play

BY

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INTRODUCTION

This book is addressed to that ever growing number of people who are interested in color and in the principles of its agreeable and effective use. In an increasing number of homes there is an awakened feeling for harmony in interior decoration. In the field of dress women are seeking more than ever before to achieve personality and independence, and to combine with vogue the note of self-expression. In the field of business there is a more ample recognition of the part played by color. The appeal of colored beads to the Indians in the early days of bartering is represented today in the part played by color in the uses of the poster, the label, the circular and the window display. In the theater the new ideas in stage-setting, in industry the search for dyes, and in military tactics the important rôle played by camouflage, all have tended to stimulate the recognition of the part played by color in everyday life.

The study of color moreover is a source of great pleasure, opening up a whole world of sensations. In the author's personal experience he has found that the habit of color observation has given to his pupils a remarkable expansion of interest. Students, awakened to the everyday applications of

color, look at their shirts, their ties, the dress of women, their homes, subway posters, magazine covers, show windows, electric signs, theater and business interiors, stage settings and business circulars, with a new and lively interest. Once they recognize that color is a force, either working for the man who employs it through arousing attention agreeably or against him through irritating the attention which it arouses, their observation is stimulated, the habit of criticism is formed and taste is developed through the practice of judgment. Once they realize nature's endless variety in color arrangements, that the very atmosphere varies in color, a walk, even through a city street, becomes a series of optic adventures.

Everybody uses color. At all points we are surrounded by it. It is becoming a more and more deliberately planned factor in a great variety of pursuits. It was in the hope that a primer of color might stimulate a fuller appreciation of the hues which lend enchantment to nature and to art, and point the way to a more harmonious use of these hues in building up our environment, that the author undertook this work.

In the field of color literature most of the books or articles which have appeared are by physicists, who are necessarily technical and concerned with color analysis and color measurement; by physiologists who, equally technical, hypothesize about the functions of the various parts of the retina, or by psychologists who record most painstaking

researches into "the color sensitivity of the natives of Egypt and Australia," "the color preferences of children," or "the effect of area on pleasantness." All these have attempted a worthwhile work and many have made important contributions to our knowledge of color.

But the more one searches the more one must marvel at the lack of any popular work on the practical applications of color. Chevreul's great contribution, written almost a hundred years ago, is a mine of ideas organized around a few simple propositions interpreted in terms of a lifetime of experience. But its form is somewhat discouraging to the modern reader. Special manuals of color mixing and color harmony have appeared, but these have been written by painters for painters and are with few exceptions rather undigested even within their own province. Vanderpoel's "Color Problems," with its beautiful plates, analyzing the proportions in the color schemes of a number of objects in pottery, weaving, furniture and painting is an example of a book which essays in modern form a broader approach than the painters' manuals. In Luckiesh's "Color, Its Applications," a brief resumé of the physics and physiology of color is followed by a very valuable scientific study of electrical problems in color illumination, color matching, mobile color, and artificial lighting. Duveen's "Color in the Home" is an engaging book with beautiful color plates illustrating some of the principles he mentions.

This however is the first modern book on color which enters into a statement of color principles from the point of view not only of color combination, but also of color fitness and color arrangement. The author has here endeavored to state these principles and then to show their applications in dress, home and business. Chapters on color in the theater, color music, colored illumination, color in community play, are merely suggestive essays on the part played by color in these fields. The book is not illustrated with model interiors, model dresses or model posters, but rather with diagrammatic material to illustrate the principles which apply in color composition. The colored papers enclosed in the pocket in the back of the book can be used for a large variety of interesting experiments, illustrating the physiology and psychology of color. The experiments are very simple and can be made a source of entertainment and pleasure to help enliven an evening at home. This will be particularly true when the applications of the principles are discussed with reference to a given room, dress, or business detail.

The author acknowledges his indebtedness to the experimental workers in the physics, physiology and psychology of color, notably, however, to Chevreul, who was the first to make an exhaustive study of the law of color contrast. As the book has grown out of a course of lectures on "*Color and Its Applications, Based on a Study of*

Museum Originals," given at the Metropolitan Museum of Art under the auspices of New York University, the author wishes also to express his sense of obligation to all those who have made the Metropolitan Museum the wonderful treasury of beauty which it is.

It should be mentioned as a feature of the arrangement of material in the book that the reader will find in Chapters II, III and IV a simple summary statement of color principles presented in the most elementary form. These are intended to give him a general survey of the field and should be re-read before each of the chapters on color in the home, color in dress and color in business. The material contained in Chapters II, III and IV is developed in much greater fullness and detail in Chapters VIII to XVI. This involves considerable repetition, but it is hoped the reader will be indulgent, as repetition is in this field a prime means to a fuller grasp of the subject.

Many applications of color such as military camouflage, the subject of dyes, the detailed study of color printing and its problems have been omitted as of too highly specialized and technical a nature for inclusion in this book. Even the author's study of the evolution of color in painting which was originally planned as part of this work has been reserved to form the basis for a separate work soon to be completed. The author mentions these omissions and reservations to indicate the vast scope of the subject of color which

opens up on every side into paths which can be followed for the vocational and professional opportunities or for the pleasures of appreciation and of amateur self-expression which they afford.

COLOR IN EVERYDAY LIFE

COLOR IN EVERYDAY LIFE

CHAPTER I

COLOR IN EVERYDAY LIFE

The Practical Application of Color. The most casual thought must reveal that color is the medium of some of our most exquisite sensations and that it is intimately associated with our most varied moods. And yet, the part played by color in life has never received any extensive study. There is a real need for a better appreciation and understanding of the principles of color and color harmony in their application to practical problems in home, dress and business, and much could be added to the enjoyment of life through a greater feeling for color effects both in nature and in art.

Before the child is born, little touches of color are being embroidered into the clothes which it will wear. From the cradle on, color will enter into its dress, and as the growing child is called upon to think for itself, the choice of color in clothes will be an abiding problem requiring dis-

crimination and taste which should, if possible, be founded on knowledge.

For thousands of years the two main preoccupations of women have been the problems of dress and home. In show room and window display, circular and poster the business man is learning the value of the color appeal. Yet the woman seeking to create a beautiful home or acquire an artistically effective wardrobe has been taught little about color principles and their application. The business man whose trade may depend in part upon an attractive show window, a well designed interior, a colorful label or box-cover, is forced to rely either upon his own untrained judgment or upon an "expert."

We speak of "the useful arts" and of "the fine arts," and by that distinction make it appear as though beauty were a superfine adornment added to life. It is not generally recognized that beauty is an absolute essential sought in the things of comfort and necessity; the fork and knife, the steam radiator and the automobile body, as much as in statues and cathedrals. If the market value of color in business were duly considered, more thought would be given to it in our scheme of vocational education. If its value in making for cheerfulness in the home, and its usefulness in enhancing the appeal of personality through dress were better understood, it would receive at least as much general and popular study and consideration as music.

The Emotional Appeal of Color. Few doubt the place of music in life. Songs and musical sounds are interwoven with our sweetest and most intimate memories. But the mood of the spring which has passed or of the autumn which is approaching, is replete with associations of color. Just as certain chords and rhythms of sound seem grave and solemn, martial or tender, so certain color chords or color sequences arouse moods, joyous, pensive or melancholy.

Color Study versus Music Study. Very few people are called upon to express themselves in music. Yet many of the girls and even boys over eight in the homes of those above poverty, are learning to play the piano or the violin. Each day their mothers or their governesses stand over them, exhorting them to continue practicing. With what result? After drilling from two to ten years, for an hour or so each day, a skill has been acquired which in many cases one year's marriage serves to dissipate. Almost every one is called upon for self-expression in color, but education in the principles of color is rare. This neglect of color study in favor of music is not due solely to the greater emotional appeal of music, but is probably an educational fad. The reader may remember the day when china-painting, polite water-colors and embroidery, were essentials in the education of a schoolgirl. The crazy quilt, the stamp plate and the gilded shoes which at that time hung from chandeliers attested to the popular interest

in color. We are no longer repeating the old atrocities. We have grown more refined and respectable in our tastes. But having renounced the old-fashioned discords, have we learned how to create the new harmonies?

The New Science of Color. Color harmony today has scientific bases in physiology and psychology, and there is no reason why its laws, simply stated and explained, cannot be taught even to the children in our schools. There are practical people who may feel that they do not need to concern themselves with color theory because the eye is the final judge of color harmony. But how often have these very people ordered a dress from a piece of goods which looked beautiful in their hands, only to find that the same goods made up as a dress was not becoming to them! After many errors they learned that they must avoid certain colors. A knowledge of the science of color might have saved them from making their expensive mistakes. "But," insist the practical, "why worry about learning the science of color, why attempt to be color artists when art is the province of the specialist? If we need advice there is always the artist to serve us."

Dependence upon Color Experts. Strange as it may seem, the artist, the "expert" in beauty, knows very little about the principles of design or of color harmony. There are few art schools in the country in which the theory of color and the laws of order and fitness are studied as composi-

tion and counterpoint are studied in a musical conservatory. The mere acquisition of a mechanical skill in copying a cast, a body, a face, a costumed figure is the sole aim of years of training. The Japanese girl arranging flowers in a vase, the woman choosing trimming for her hat, these face the conditions of design and color-expression much more closely than the art-student in his school, or, for that matter, most artists in their studios, who mechanically copy from their models or from nature without much object other than correctness in imitation. Many of our painters would have much to learn before they could become good poster designers. The women are notoriously careless in dress design, and studios rarely can serve as examples of taste in interior decoration.

The Interior Decorator and a Detached Good Taste. Those who will grant the justice of this arraignment of the artists, point, however, to the interior decorators. Here, it may be claimed, is a growing body of thinking men and women who seek to relate their art to the conditions of life. But too many interior decorators merely assemble very expensive trimmings and furnishings, relying more on the beauty of the material than on trained judgment.

Granting that with an improved curriculum in our art schools we would have more experts in color and design, the problem of art in life would even then be unsolved. A democracy or even an

aristocratic patron class should not depend upon a detached good taste. Whistler remarked that "the home of Mrs. Y. is well furnished; not that the people have any taste; they do not need any. They employ some one who knows, but there is always one little vase on the mantel which gives the whole show away."

Beauty in Everyday Life among the Greeks. Great artists and great craftsmen existed when there was a pervading feeling for beauty in the people and in their daily lives. The taste of the painters, sculptors, and architects of Greece was based in large measure upon the democratic art of its primitive pottery, and the search for beauty in the simplest utensils of daily life. The primitive Greeks who wished to be interred in a vase of perfect proportions and shape, after a life in which they drank their water as well as their wine from beautiful forms, were founding a tradition of beauty in the things of use, which was bound to extend upward to every form of construction and finally to a wonderful flowering in "the Fine Arts."

Democracy in Color Expression. If we are to achieve democracy in art, every person must approach color expression, whether it be in business or home decoration, in city planning or in dress, as an art calling for love, knowledge, and imagination. This is not merely an æsthetic plea, it is an ethical plea. For the artist's attitude towards life is a deeply religious one, with a great regard

for the worth that is in man, the dignity of life, and the value of love. "Pollyanna" preaches the philosophy of gladness. Be glad that it was only one leg lost, or only one parent gone. This may be a useful attitude and a desirable one, but it is an almost impossible one to anybody who is not an artist in life, a creative worker, expressing love and imagination through the material at his disposal.

Pollyanna vs. the Artist Attitude. Not "be glad," but "be creative and you will be glad" is the keynote to a fair share of contentment and joy in life. Sensual pleasures satiate. There are times when sensuous pleasures and appreciations tend to become dulled. But the sense of growing power in the handling of the material which one has chosen to use, makes of life a progressive adventure, centered and purposeful.

How can we all be artists? In the broad sense of the word, everybody is an artist. The days, the years, the environment, the accidents of fate are the material with which we work. Time is the canvas. What is created upon this canvas with the given material is the test of artistic skill.

There are many who say, "If I only had money; or love, or sympathy, or influence, or two years in Paris, what wouldn't I accomplish!" But the test is not what they would accomplish with the means which are not at their disposal, but what they can create with the means which are.

The Home Builder as an Artist. In the special

field of color harmony and beauty in home and dress, many women explain that they love beauty but cannot achieve it because they cannot afford it. They insist that if they could afford Oriental rugs and Persian pottery their homes would be models, "but what can be done with so little money?"

Much can be done. More necessary than money is the love and knowledge of color and design. Some of the most costly homes in New York City would look pathetically or ridiculously ugly to a poor Japanese artisan. He, with love, makes a room of four-paneled walls, embellished by a mat, a vase and a flower, a place of cheer. The millionaire through lavish outlay assembles gold frames, Chinese paintings, Aztec idols, and crystal chandeliers, "all the wealth of Ormuz and of Ind," only to achieve a tremendous mass of incongruities.

Color Judgment and Transformed Homes. That it is not the cost of the material but the artist's approach to its selection and arrangement which counts in home planning can be definitely demonstrated by this suggestion. Let every woman in this country devote one half of her next holiday to the study of one room in her home; without getting any new material, without even increased knowledge, but merely with intenser and more critical effort, what a change would come over that room! The first thing which she might observe is that some of the color details in the

room could be removed to the advantage of the general effect. That is certainly not costly. Experiment would prove that the pictures could be hung to better advantage, the hangings could be redraped and the furniture rearranged. Regarding that room as a canvas in a frame, every housewife working at its harmony in this spirit would become a more proficient artist because a less indifferent one.

If without increased knowledge and without changed material the homes of the land could be improved through such a concentration of critical effort, what possibilities are opened by the thought of women grown conscious of their position as artists in home-building, educated to an understanding of color principles and the laws of design. For not only in the broad sense can every one be an artist in the living of life, but every one can be an artist in the more technical sense, in the choice and assembling of things.

The Home a Confession of Taste. A woman's home is a confession of her taste and of her love of order even more than it is a revelation of her purse. The most lavish purse may give her endless opportunities to exhibit her weakness of judgment; a very moderate one will make possible a home which would be like a chastely designed painting or temple, a perfectly proportioned, harmoniously colored and beautifully spaced arrangement, agreeable to the eye and cheering to the spirit.

Theatrical Settings in the Home. In recent years there has been a growing tendency to use pure colors in home decoration, to plan the home on the model of a stage-setting by Urban or Bakst. Those who do this may imagine themselves quite sophisticated and color-wise. They ridicule the timid who, avoiding pure colors, indulge in grays, browns, blacks and whites. But the acceptance of a vogue of strong colors may also be a sign of timidity if it is prompted merely by the fear of seeming old-fashioned. The mere use of intenser colors does not make one a "modern" in the best sense of that word. The essence of a truly modern use of color is a truly modern knowledge of color properties.

Color and Divorce. The following anecdote apropos of interior decoration may seem to make extreme claims for the power of color in the home, but it is probably not altogether far-fetched. Two college chums met after a lapse of years. One was married and in business. The other was a color chemist in a pottery firm. In the course of a long chat, the married one who was under great tension forgot reserve, and confessed to his old friend that there was incompatibility at home and that he saw no way out but divorce. Questions soon revealed that nothing more serious than a case of nerves was at the bottom of the domestic difficulties.

That evening the chemist, dining at the home of his friend, remarked in the course of conversa-

tion when the two were alone, "This red room is enough to drive anybody who must live in it quite mad. You do not need a change of wife; what you need is a change of wall-paper."

Chromo Therapy or Color Healing. Those who are not especially sensitive to color are not likely to realize, as did the color chemist, the peculiarly irritating properties of certain colors and color combinations. They may suffer without suspecting the cause. The ultra-violet rays which are in reality invisible colors are much used in healing, and there are physicians who believe that visible colors may possess medicinal properties. Retinal activity is intimately related to nervous conditions, and the subject of color in relation to healing may prove to be well worth the closest investigation.

Woman as an Artist in Dress. In the case of the troubled home and its irritating wall-paper, one may suspect that the nerves of the wife were further put on edge by the problem of her clothes. Women can sympathize with her in the tension and anxiety attendant on the adventure of a new dress. How many anxious hours are spent between the day when she first buys the goods across a counter and the moment when she sees it at last in the finished gown upon her figure. One glance tells her the sad answer; another mistake; she knows instantly that under no circumstances will she wear that dress.

Lack of Color Knowledge in Dress. Does she

learn her lesson? Does she know the reason why the color, so attractive on the model, makes her eyes look dull, her hair faded, and her face weak? Only vaguely. In her very next dress she is likely to repeat a variation of the same error. The color may be different, but the principle violated may be the same. Yet in spite of her many heartaches due to dresses which did not turn out right, if asked what there is to color harmony in dress, she would repeat the old formula about making the color of the dress match the eyes.

The Eyes and a Popular Fallacy. There is a common notion among many women that the problem of color harmony in dress is quite a simple one and that it can be summed up in the one sentence: "Make the color of the dress match the color of the eyes." Even dress designers, on being questioned by the author as to their ideas on color, have used the same formula. The barest analysis of this quick and ready means for achieving dress harmony reveals its complete failure to meet the facts. In the first place, even if in a sense true, this formula is certainly quite limited in that it prescribes one color for each person. If it were followed, all blue-eyed women would wear blue; brown-eyed women, brown; black-eyed women, black; gray-eyed women, gray. But if we except the case of the blue-eyed wearing blue, the theory does not apply in the least, for in not a single other case does such a correspondence of colors necessarily give a happy combination. In

fact, we shall see that in the case of the brown-eyed, a dark brown would, in many cases, be taboo. Here, then, in this one short summary of the whole of women's conscious knowledge of color, the need of a new attitude and a more scientific approach becomes apparent.

Personality and Color in Dress. Color in dress is a prime means to providing a frame and setting for the personality of the wearer, and calls for an artistic skill in adapting the material to meet the decorative requirements. Colors may make the short and the stout seem less stocky; the tall and over-slim seem fuller. It may set off the face so that the eyes and hair take on an added lustre, the skin a warmer glow. It may soften the facial lines of the woman whose features are "edgy"; it may accentuate the somewhat diffuse charm of a sweet young girl.

Color in dress may express mood just as color in painting does. Color may impart a sense of light airiness and youthful freshness. It may be made vital and emphasize the magnetism of eyes and expression. It may accent the note of elusiveness and subtlety in one character, the genial warmth and good nature of another.

Colors must be selected more with concern for complexion, features, character of expression and personality than with reference to the eyes. The subtle interaction between colors, whereby one color will make a blonde seem sallow and another will make her skin seem charmingly pearl-tinted,

are not so easily to be caught in the phrase, "make the color match the eyes."

The Business Man as Color Artist. A man is quite likely to think of color as something which belongs to "art" and therefore as too "effeminate" a matter to receive the consideration of a practical person. Yet in his large store for which he pays a rental of twelve thousand dollars a year, the value of a show window at a busy corner may have been estimated at eight thousand. That window is his silent salesman, either efficient and business-producing, earning its cost over and over, or inefficient and business-losing. If the maximum selling power of a window were to be represented as one hundred, his window, dressed without a conviction as to the drawing power of color and without knowledge of its most effective use, may be operating at twenty-five per cent. or less of its maximum efficiency.

Man as well as woman should be interested in color harmony in dress, for within the limited range of his color schemes there is still room for the application of color principles. He should also be interested in the application of color harmony to the home, planning its effects with his wife. But in the field of business, which is engaging the expert thought of men to-day, there are few lines in which a knowledge of color is not essential. The business man uses color, and pays dearly for its use. He should be in a position to judge whether the colors employed are effective.

The Store Interior Color Schemes and Patronage. The importance of color in business can be demonstrated in a number of ways. Five firms each run a chain of lunchrooms in a large city. All things are equal; choice of location, cleanliness, food, service. They are near enough to one another to be rivals for the same patronage. But one thing is unequal; the color effect in two of these is depressing, in one it is fair, in another it is good, in the fifth it is excellent, very cheerful and stimulating. Although we may assume that few of the tens of thousands who patronize these places are consciously aware of any differences, subconsciously the color schemes would operate to the advantage of the one chain and to the disadvantage of the others in exact ratio to their quality.

A certain New York firm on Fifth Avenue has become one of the most attractive spots on that busy thoroughfare through the use of mural decorations as a background for exquisite window display. The attentive crowds which are held by its windows prove that in a department store, color effectively used can become an important asset. The manager himself should understand color so as to be able to judge the taste of the buyers he employs in the various departments. He should be in a position to judge the advertising value of the circulars sent out. In the mail announcing an exhibition of gowns designed for his firm by Madame X. there will be twenty other such an-

nouncements. The color scheme of his announcement may hold the attention of the recipient and make the difference between a casual glance and a careful reading.

A firm wishes to advertise an exquisite perfume by means of subway posters. Shall the posters be strikingly bold and rich in color harmony? Such a scheme would catch the eye, but would it suggest the refinement and subtlety of aroma which needs to be conveyed? A refined color scheme, on the other hand, would be ineffective through its relative quiet and unobtrusiveness. What is the solution? A study of the science of color will give the answer.

Color Novelty in an Advertising Campaign. A firm has a new beverage to promote. The members of the firm are convinced that the drink is good. The problem of advertising is how to convince the public. A novel idea is sought. Advertising men frequently put the ideas into their copy. But why not put the idea into the bottle? Something odd in color, something that once seen will not, cannot be forgotten; something that can be incorporated into the very color of the bottle itself. Let this again be advertised by a display bottle containing a mechanical device for lighting up the bottle from within. That glow, radiant, warm, and exotic, would catch and hold the attention. The name and drink would be fixed upon the memory. Sooner or later, through this type of advertising, the beverage would be popular.

Color and the Art of Appreciation. One of the most important aspects of color in daily life has been only hinted at in the foregoing. Many as are the pleasures and even profits derived from the skilful use of color, expression in color is limited to time and place. But color observation, the sensitive response to color, the enjoyment of the endlessly varied effects in nature, in art and in our daily environment,—this is a pleasure which can enrich experience, bringing to any moment, almost at any place, swift, keenly felt thrills which make for the fullness of life. Pottery, rugs, textiles, painting, sculpture, even architecture reveal infinite gradations of color charm to the eye trained to the observation of color harmony.

And what an endless spectacle of color novelties Nature provides,—from the faint grays tinged with the rose of dawn to the glaring shrill notes of high noon, to the soft mysteries of the cool, blue night. Leaves, flowers, sea-shells, the ears of babes, the hair of maidens, the eyes of women, moon-lit walls, mist-laden valleys and cloud-capped mountains,—all the myriad forms of Nature reveal a myriad subtleties of color in the ever changing play of light and atmosphere.

CHAPTER II

WHAT COLOR IS AND HOW IT ACTS[1]

The Nature of Color.[1] All objects are either luminous or non-luminous. Luminous bodies like the sun and stars radiate light. Non-luminous bodies like a face or a rose reflect light. The sun and all luminous bodies are visible because of the light which they radiate. The face, the rose and all non-luminous bodies are visible because of the light which they receive from luminous bodies and which they then reflect.

In the light which comes from the sun there are many colors; violet, blue, green, yellow, orange and red and their intermediates, red-violet, violet-blue, blue-green, yellow-green, yellow-orange, and orange-red. This fact can be demonstrated by holding a crystal glass, such as is used as a pendant in the old chandeliers, over the white margin of this page. If this is done in the sunlight, the light of the sun in passing through the crystal will be broken up and the colors of the rainbow will appear upon the margin. The rainbow in the heavens is due to the same breaking up of sunlight by raindrops acting as crystals. Colors then exist

[1] This chapter summarizes Chapters VIII, IX, X, XI and XII. See introduction, page XV.

in light, and white light is the composite result of the colors previously listed.

Why the Rose is Red. If white light which contains all these colors shines on a piece of ebony or on a rose, why is the ebony black and the rose red? This is due to the fact that objects react differently to the light which falls upon them. Some objects like dull ebony absorb almost all the light which they receive, and others like the rose absorb part of the light and throw off the rest.

The Rose is Red because It has no Affinity for Red. It is red because of all the colors which are in the light which strikes it, red is the one color for which it has no use. So it absorbs the violet, blue, green, yellow and orange components of the white light, and reflects or throws off the red which is in the light. Likewise the cornflower absorbs all the colors in light but blue, which it throws off. The golden-rod absorbs all the colors but yellow. No matter how startling the fact may seem it is nevertheless true, that the colors which we so admire in objects, the colors by which we know objects, are the colors for which those objects have no use.

Color and the Eye. It was just stated that the rose appears red because it reflects red. But a red rose does not appear red to some people. Men who must recognize signals are tested to see whether they can distinguish between colors. This is done because although an object reflects red, the object will not be seen as red by people

who have no nerve endings which respond to red. This fact of color-blindness and other experiments seem to prove that certain nerve endings which line the retina of the eye are especially sensitive to color; and that some of these nerve endings are more sensitive to one color than to another.

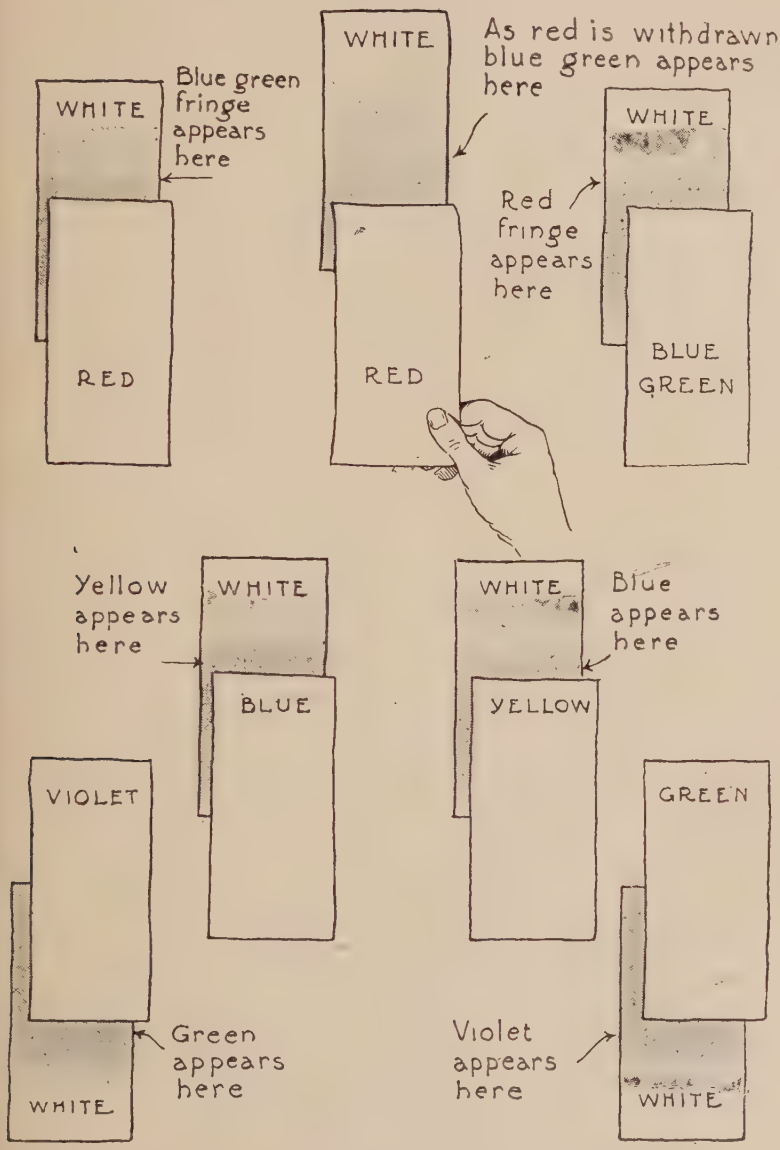
There are green color-blind people deficient in nerve endings sensitive to green, red color-blind people deficient in nerve endings sensitive to red, and there are totally color-blind people to whom the world is colorless and all objects are seen as grays, ranging from white to black. It is suspected that there was a time when all people were color-blind, that they responded to the world only as light and dark, and that the development of retinal sensitiveness to color has been acquired quite slowly through the ages.

A study of the practical uses of color must be based quite largely upon the effect which given color combinations have upon the eye. In the same sense that sounds may irritate or please the ear, so colors may irritate or please the eye purely as a matter of immediate nerve reaction. The nerve endings in the retina which respond to colors may be quite as much hurt by the shock of certain color combinations as the ear is hurt by the noise due to scratching on glass.

Eye Fatigue and Color Complementaries. Important in its application to the every-day uses of color is the fact that given retinal nerve endings can very easily be fatigued through over-

COMPLEMENTARISM AND EYE FATIGUE

TESTS WITH COLORED SLIPS



The shaded portion represents the area of the colored "after image" or after percept" which appears in each case

stimulation by the color to which they are especially sensitive. Pure red, yellow or orange will fatigue and irritate the eye sooner than will blue, violet or green, but any color will cause this fatigue if kept in the field of vision too long.

The advertiser seeking effectiveness in a circular, the woman searching for novelty in the color scheme of her home or her dress, will realize the importance of an understanding of the nature of eye fatigue and the dangers of over stimulation of the eye. The eye demands a certain balance of colors if it is not to be irritated to the point of fatigue. An important clue to the attainment of this balance will now be considered.

Experiment with the colored slips in the back of the book will reveal the nature of eye-fatigue. One such experiment will be described. This experiment can be repeated with different colors and the results in each case noted. Let the reader take the brightest red slip and hold it against a white sheet, so that it only partly covers the white. Now look at the red steadily for about a minute and a very pale bluish green fringe will appear along the edge of the bright red paper. (See Plate II.) Then slowly withdraw the red, and observe upon the white paper beneath the red a decidedly bluish-green cast. The result of this and similar experiments with the other papers can be tabulated as follows:

Red will cause a blue green to appear on white
Blue green will cause a red " " " "

Blue will cause a yellow	to	appear	on	white
Yellow will cause a blue	"	"	"	"
Green will cause a violet	"	"	"	"
Violet will cause a green	"	"	"	"

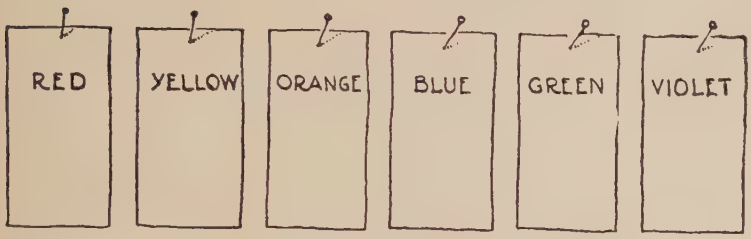
The fringe of a second color which results from long gazing at one color against white is explained as due to the exhaustion of the nerve endings which respond to the colored slip. In looking at the red against the white paper, the nerve endings responding to red grow tired and the eye then begins to see in the white page only part of the colors which it reflects. The white page is reflecting red, blue and green rays. As some of the nerve endings in the eye have been exhausted by the red rays which have been exciting them, the eye responds more fully to the blue and green rays which come from the white page. This blue-green which results from over-exposure to red is called the complementary of red. When the eye is over-exposed to blue, the nerve endings respond more fully to the red and green in the light. As red and green mix to produce yellow, yellow is the complementary color to blue. Green and violet are also complementaries. *Complementaries are colors which together sum up as white light, and tend to produce a balanced stimulation of the nerve endings of the eye.*

It will be realized from the foregoing that color complementarism is of prime importance in selecting color schemes. There is, however, great danger in the use of pure complementaries. Colors

ACTIVITY OF COLORS

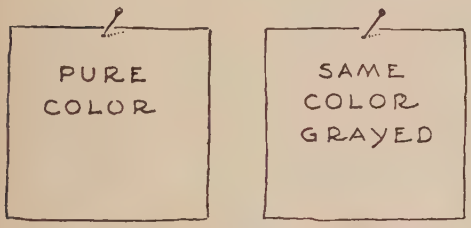
TESTS WITH COLORED SLIPS

a



R.Y.O. ADVANCING will carry further than
B.G.V. RECEDING

b



Pure color will carry further than same color grayed (If both are equal in value)

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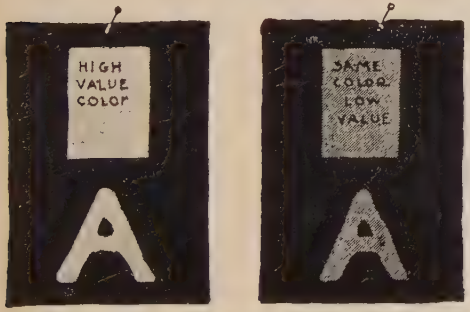
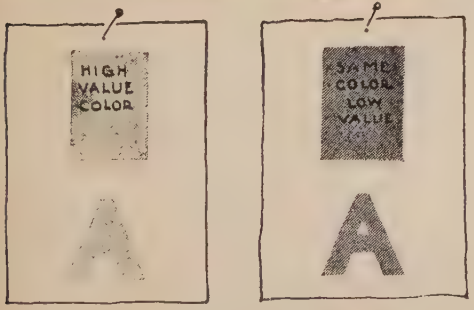


A light color will carry best on black or any dark color (if both are equally pure)

d



A dark color will carry best on white or any light color (if both are equally pure)

have given qualities. The complementary colors used pure present the most extreme contrast of these qualities, and are therefore quite likely to offend through the shock of their differences.

The Qualities of Color. Colors differ as regards their force. Some colors are active, forceful and advancing; others are passive, timid and receding. Colors differ as regards their suggestion of warmth. Some are warm or even hot in suggestion; others are cool or even cold. Colors also differ as regards their suggestion of weight. Some seem heavy and ponderous, others light and airy.

Force in Colors. To test the activity of colors, pin a pure red, a yellow, an orange, a blue, a green and a violet slip upon the wall and stand at the opposite side of the room. Now see which of these "carry" best. It will be found that the orange and red are decidedly advancing and can be seen most clearly as color. Yellow is also advancing, but the lack of contrast between yellow and white may fail to reveal this. The blue, green and violet are relatively receding, for though they will carry as dark spots, their color quality will not be very clear. (See Plate III.)

Advertisers, window dressers, even interior decorators must reckon with this quality of color as it may play a very important part in their problems. A small room designed in advancing colors will seem smaller. It will be shrunk by the fact that the colors crowd in upon the eye. The store-

keeper on the "off side" of the street might well resort to advancing colors in his show-window, outside window frame and signs, as these would carry across the street and overcome the handicap of location. The designer of fence posters intended to be read by passing automobilists should experiment with his colors to test their force and power of advancing or "carrying."

Complementary colors when pure present a sharp contrast in this respect, e.g., yellow is extremely advancing against blue; red is very active against blue green. Pure green and violet, however, do not contrast so sharply when placed one against the other.

Heat in Colors. If all the colored slips in this book were pinned up and any group of people, young or old, were asked to record individually which of the colors seemed warm and which seemed cool, it would be found that with almost absolute accord they would agree that the reds, yellows, oranges and their compounds are warm, and that the blues, blue-greens and blue-violets are cold. Yellow-green and red-violet would generally be called warm. Grayed colors would be called warm or cool as they ran towards yellow, red and orange on the one hand, or towards blue, green and violet on the other.

This quality of colors is also very important in planning color schemes. It will be found that though people generally seem to like blue and speak of green as restful, most people would be

repelled by a room interior, a poster, a circular or a stage-setting which ran all to pure blues and greens. For just as the plant turns towards the sun, it will be found that man is inclined to prefer a note of warmth in a color scheme. In a summer home, cool grays may be deliberately employed to off-set the fatigue which the eye has been exposed to on the blazing stretches of the beach or on the dazzling rocks. The coolness of the colors may even have a psychological effect through association. But the love of red roses, yellow daisies and the warm colors of flowers generally is a symbol of the joy which the eye takes in an area of eye-stimulating warmth.

The good color scheme is built upon a balance of warm and cool notes and is neither flushed nor cold. But complementary pairs, when used pure present an extreme contrast of warmth and coldness which is rather unpleasant. Thus yellow is warm, blue is cold; red is warm, blue green is cold. Green and violet do not present quite so sharp a contrast in this respect.

Weight in Colors. Colors differ in their suggestion of weight. If the reader will once again resort to the colored slips, a large number of experiments can be carried out to determine which of the colors seem heavier. The nature of the experiment is simple. Hold a gray slip against a red so that four inches of the red show above the five and a half inches of the gray. Hold the two vertically so that they will suggest a scheme for

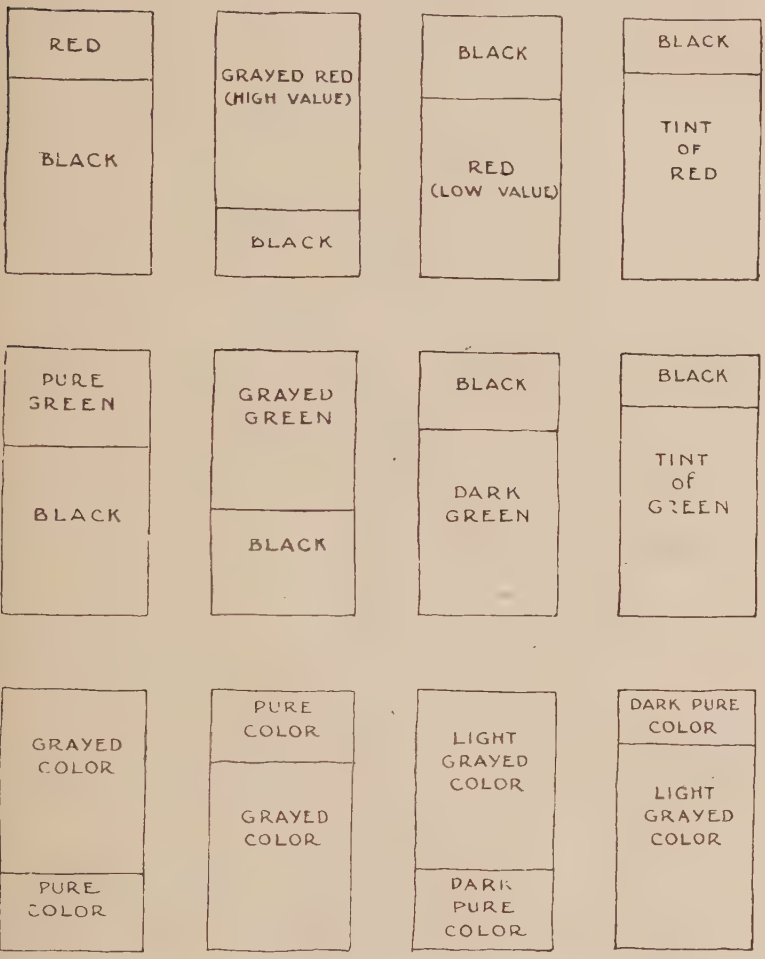
paneling a room, a broad red border above a gray woodwork. It becomes obvious that the red is too *heavy* for the gray. Move the gray up so that only one inch of red shows; the gray now seems able to support the red more easily. Substitute for the red a pale pink and the gray can now be moved down again, since the pink will seem lighter in weight than the red, and five and a half inches of gray will easily support two or even two and a half inches of pink.

The experiment can be tried with many different combinations and the importance of this element of weight in colors will become most apparent. If in the mood for psychological investigation, the reader can help to stimulate color thinking by trying these combinations on visitors as an hour's pastime. Ten or more different combinations could be given separately to each of the subjects to manipulate as above until adjudged balanced in weight. The answers can then be noted. It will prove most interesting to all to see how much agreement there has been, upon the proportion of one color needed to support the weight of the other.

Top-heaviness in a hat, a book-cover design, a poster, a room interior or a painting will result from a failure to appreciate the quality of apparent weight in colors. A room may be made to seem much lower through the weight of the colors in the upper areas. Pure colors seem heavier than the same colors grayed; dark colors seem heavier than light colors. (See Plate IV.)

BALANCE OF WEIGHT

TESTS WITH COLORED SLIPS



These illustrations do not represent measured statements. They merely indicate the principle of balance of weight which applies in color composition. The paneling of a wall or a dress, the lay-out of a circular, the color note of a hat, offer problems in the balance of weight in colors.

The Law of Simultaneous Contrast. It has been seen how important is the fact of color complementarism in the choice of color schemes. At least equally important is the law of simultaneous contrast. *Colors placed either alongside of one another (juxtaposed) or in such a way that a small area of one shows upon a larger area of the other (superimposed) tend to modify one another.* This fact is known as the law of simultaneous contrast.

In planning a color scheme for a blonde, in selecting trimmings for a hat, in choosing the background in a store window to set off the display, in selecting the vase and flowers which are to be the enlivening note in a room interior, the principle of simultaneous contrast is the clue to the most effective results. The sallow blonde may look more sallow or her complexion may seem more vital and rosy, depending upon the choice of the colors in her hat and more particularly in her collar. This is only one of the endless applications of the principle that colors are modified in appearance by their proximity to other colors. If the fullest understanding of the principle makes a little experimenting necessary, the effort should certainly not be grudged.

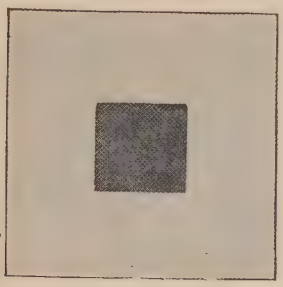
Plate V illustrates a number of experiments which can be tried out upon as many different people as the reader may choose. Each of the squares (a) and (b) has a smaller dark gray square superimposed upon it. These smaller

squares are equally dark. But the small square on (a) which is light gray will seem darker than the same small square on (b), which is black. Each of the squares (c) and (d) has a smaller gray square superimposed upon it. These smaller squares are equally light. Yet the square on (c) will seem lighter than the square on (d). In the figure (e), a series of gray oblongs placed alongside of one another, note that although these oblongs are all flat in color, they present the effect of fluted surfaces. This is so because the left half of each seems lighter than the right half through simultaneous contrast.

These experiments with grays also illustrate to an extent the influence which colored squares would have upon one another. If the reader will duplicate the experiment in (a), (b), (c) and (d), using colored slips for the smaller squares, it will be found that small dark blue squares cut from the same sheet will seem lighter or darker through simultaneous contrast. A dark blue will seem darker upon a light gray than upon a dark gray. A light blue will seem lighter upon a dark gray than upon a light gray.

Let us go one step further. Place the small blue squares on larger colored squares, and it will be found that the dark blue upon light colors, such as pure yellow, will seem darker than the same blue upon dark green. It will also be seen that the light blue upon a dark green will seem lighter than the light blue on a pale green.

SIMULTANEOUS CONTRAST



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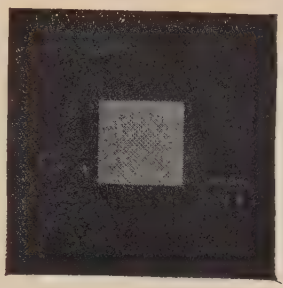

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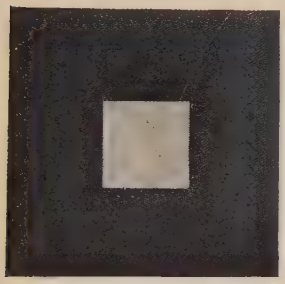

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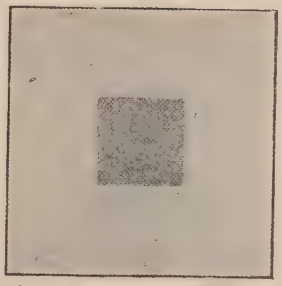

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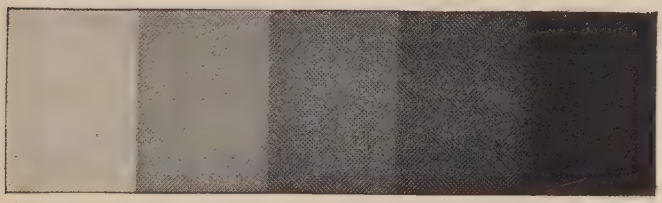

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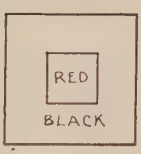

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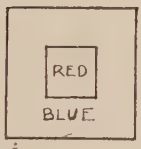


j

(a) and (b) The small square on white seems darker (c) and (d) The small square on black seems lighter. (e) Five flat grays present fluted appearance. (f) to (j) These experiments will prove how different the red will look on different grounds.
The reader can make many similar experiments, substituting V. B. G. Y. O. for the red.

Still following the method of (a), (b), (c) and (d) on plate V, let the reader now place a small red square upon a large yellow square. The yellow will become greenish and the red will become violet in cast. For the red will throw its complementary blue-green into the yellow, and the yellow will throw its complementary blue into the red. To prove that the yellow has been made greenish by the red, place alongside of the combination of a red square on a yellow square, a combination of a small blue square on a yellow square, and also a small red square on a blue-green square. It will now be seen that the yellow combined with blue looks purer than the yellow combined with red; and also that the red combined with blue-green looks purer than the red combined with yellow. (See (f), (g) and (h) on Plate V.)

For the many other effects of the law of simultaneous contrast the reader is referred to the chapter on this subject. The principal results will here be summarized and the reader can use the colored slips in innumerable combinations to verify them.

1. Colors are influenced in their darkness or lightness by the darkness or lightness of the colors which adjoin them.

2. Colors are influenced in their hue or quality of color through their neighboring colors. This influence can be clearly anticipated since each color throws into its neighbor its own complementary. Thus blue throws yellow into its neighbors

and will therefore make white seem yellowish; it will make gray seem warmer; it will make red seem orange; it will make green seem yellow-green, as in Plate VI, figure (g).

3. Colors are influenced in their intensity or purity by simultaneous contrast since two complementary colors both seem purer and fuller when juxtaposed or superimposed. (See Plate VI, figure (b).)

4. All light colors will seem most striking on black.

5. All dark colors will seem most striking on white.

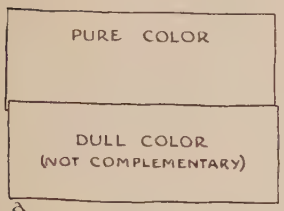
6. Dark colors on a dark ground which is not complementary to them will seem weak; edges will be lost and the pattern will be vague. A line of white or any other light color separating the two dark colors will be found useful in strengthening and clarifying such a scheme.

7. Light colors on a light ground which is not complementary will seem weak; the edges of the squares will be lost and the effect will be vague and lacking in clarity. This can be offset by a line of black or any other dark color, (preferably complementary), separating the two light colors.

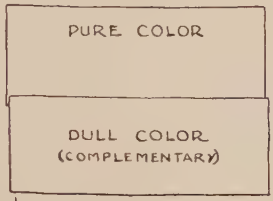
8. Bright or pure colors on a dull ground of the same hue or of any other hue not complementary, as, for example, a bright red on a dull red, on a dull blue or on a dull yellow, will deaden the dull color. The bright color will not gain much from such a contrast, since the duller color will affect

SIMULTANEOUS CONTRAST

TESTS WITH COLORED SLIPS



a



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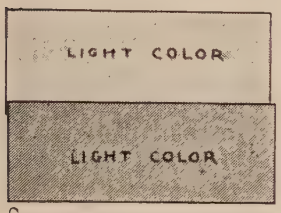

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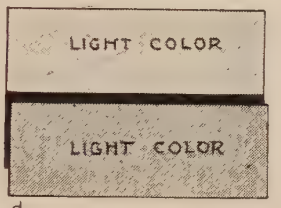

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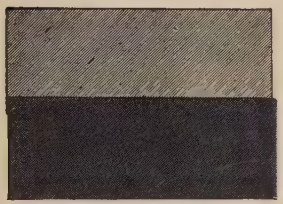
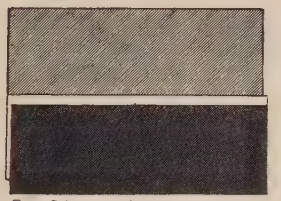
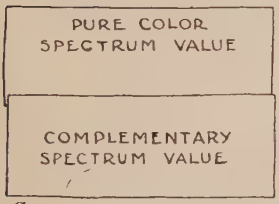


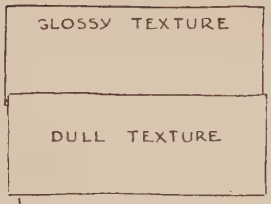
e DARK COLOR ON DARK



F DARK COLOR ON DARK



g



h

(a) These deaden one another. (b) These enhance one another. (c) and (e) Vagueness of effect; blurred edge between the two. (d) and (f) Clarity introduced into former through separation of close values by contrasting note. (g) Colors at maximum forcefulness. (h) Simultaneous contrast of textures.

its purity. Bright colors, if they are to be combined with dull colors, go best with complementaries. (See Plate VI, figures (a) and (b).)

The facts just stated in 6 and 7 can be simply demonstrated with the colored slips. Place one light color over another light color, so that the whole length of one of the slips shows and only two inches of the other. Observe the lack of clarity, the vagueness at the edge. Now introduce a third slip of black or any other dark color, so that a thin line of dark appears between the two light colors and the improvement will be noticed at once. (See Plate VI, figures (c), (d), (e) and (f).)

The Naming of Colors. One difficulty in writing about colors must now be faced. The reader, if a painter in oils, thinks of colors as siennas, umbers, ochres and madders. If a painter in water colors he has besides a whole range of color names quite strange to the painter in oils, such as burnt carmine, alizarine red, Naples yellow. The woman selecting dress goods has a color vocabulary which quite puts the painter's to blush, such as "elephant's breath," "tango," "flame," etc. To name and standardize colors has been the effort of a number of workers in the field of color study. It must be obvious that for many purposes, such as printing, it would be most desirable in the selection both of stock and inks, to have colors standardized.

Munsell, an American writer, in his book on "Color Notation" and in his color apparatus and

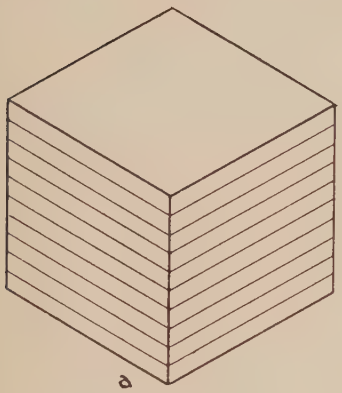
charts, has endeavored to create a set of color standards, and simple devices for teaching them. His system, which the author follows in the main, is summarized in the chapter on "Color Nomenclature."

The Threefold Character of Color. Colors may differ from one another in three respects: (1) Two colors may differ in quality, in other words one may be blue, the other yellow. This difference is called a difference in *hue.* (2) Colors may differ from one another in the amount of light which they reflect. Thus a yellow may reflect more light than a blue, or two blues may reflect different amounts of light. One blue may reflect very much light, in which case we call it a light blue; the other may reflect little light, in which case we call it a dark blue. The difference in the amount of light reflected by colors is called a difference in *value.* (3) Colors may differ from one another in their purity. Thus two colored papers may both be blue, in which case their hues would be the same. They may both be equally light, in which case their values would be the same. But one may be a pure and intense blue, the other a grayed blue, dulled in color. The difference in the amount of purity or fullness of hue is called *intensity.* (Munsell calls it *chroma.*)

The difference between brown eyes and blue eyes is a difference in *hue.* The difference between light blue eyes and dark blue eyes is a difference in *value.* The difference between the blue

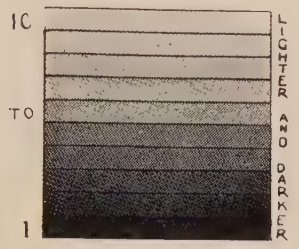
COLOR NOMENCLATURE

THE COLOR CUBE



a

SCALE OF VALUES



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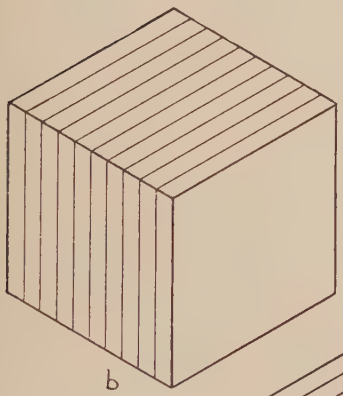
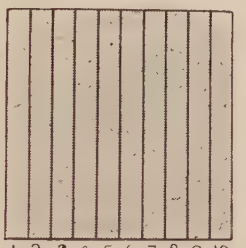


b

SCALE OF INTENSITIES



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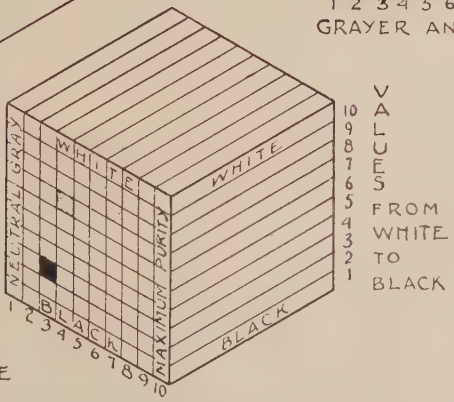


c

The ten grays on figure (e) represent ten different degrees of intensity from neutral gray to maximum purity of hue.

eyes of a babe, and the faded gray blue eyes of a grown-up is a difference in *intensity.*

Color Notation and the Color Cube. Plate VII illustrates the threefold character of color and is a clue to color statement. Let the figure (a) represent a cube composed of ten horizontal slices progressing from white at the top, through tints and shades of red to black at the bottom. Each of the slices between white and black would represent a different value of red. Any red could then be described as a red of value 8 or 9 if it is very light, or a red of value 2 or 3 if it is almost black. Let the figure (b) represent a cube of ten vertical slices progressing from the front slice which is a red as intense as can be imagined, to the tenth slice at the back, which is so gray that one can hardly sense the tinge of red in it. Each of these slices would represent a different intensity of red. The very pure reds would be intensity 7 or 8; the very gray ones, intensities 1 or 2 or 3.

The figure (c) represents a cube composed of one hundred square prisms. All prisms in the same horizontal plane are equal in value. All prisms in the same vertical plane are equal in intensity. The color of any given square prism would be identified by giving its value or position between white and black, and its intensity or position between gray and maximum purity. Thus the square prism on the third row down, four from the front, would be value 8, intensity 7. The square prism on the fourth row down and seven

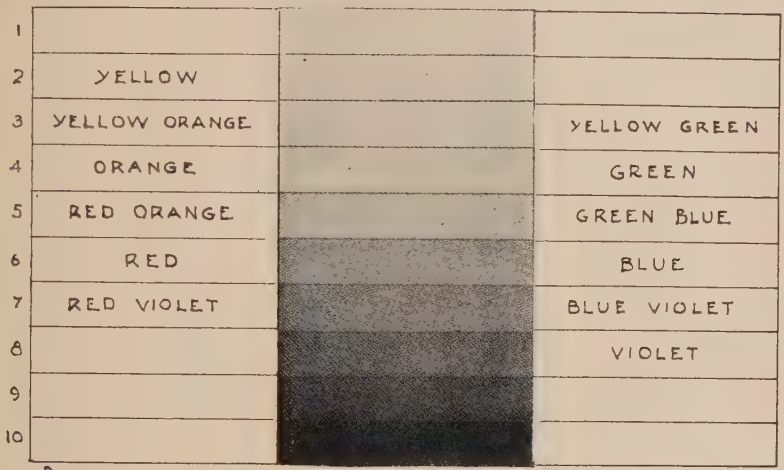
from the front would be value 7, intensity 4. The reader will now be in a position to name any of the others.

By a little practice the reader can learn to name any color seen in nature or in art. The method is first to determine the hue, which is stated simply as violet, blue, green, yellow, orange, red, or red-violet, blue-violet, blue-green, yellow-green, yellow-orange, orange-red. To these hues may be added browns, yellow-browns, orange-browns, russet-browns, even violet-browns. The next step is to decide on the value, or the degree of light or dark in the color. Is it almost as light as white? Then it is value 2 or 3. Is it about half-way between white and black? Then it is value 5. The next step is to decide on the intensity of the color. Is it quite grayed or is it quite positive? If very gray, it is about intensity 2 or 3. If very pure, it is about intensity 5 or 6. Colors as found in non-luminous objects, unless in the direct light of the sun, are rarely to be expressed as higher than 6 or 7.

By this method, which becomes quite simple after a little practice, the reader can learn to memorize colors, to make a quick note of a color scheme observed somewhere, and to reproduce the color quite closely from the formula hue-value-intensity. This might be written: hue $\frac{\text{value}}{\text{intensity}}$; e. g., blue $\frac{3}{4}$. Grays would be expressed as gray $\frac{4}{\ }$ or gray $\frac{8}{\ }$, as grays have no intensity.

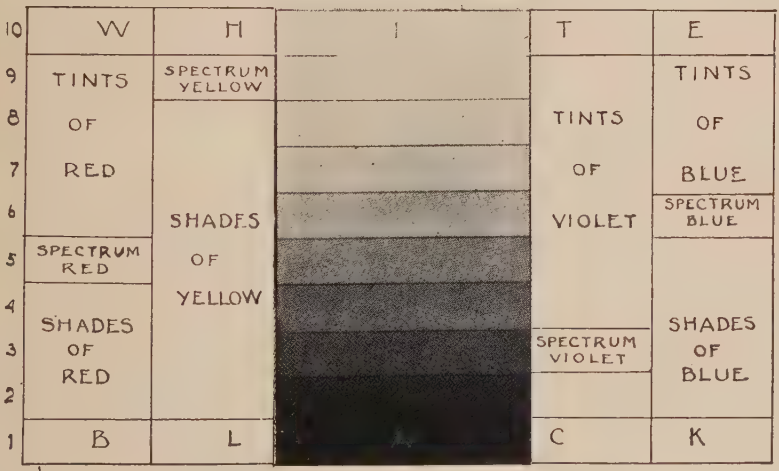
COLOR NOMENCLATURE

SPECTRUM VALUE SCALE



a

TINTS AND SHADES



b

(a) When light is broken up by physicists, the spectrum which results reveals yellow as near to white in value; and violet as close to black. (b) This scale leaves no place for the indication of tints of yellow or shades of violet.

It would afford good practice in the application of this nomenclature for the reader to apply it to the colored slips, marking each of them upon the back with its hue, value and intensity.

Spectrum Values, Grays, Tints and Shades. Grays will of course present no difference in intensity, as they are all zero in intensity. Grays differ only in value. Plate VIII, figure (a), shows a scale of grays in ten values from white to black.

When the colors in light are broken up so that they fall upon a screen in their fullest intensity, the result is known as a spectrum. Spectrum yellow is very light as compared with spectrum violet, which is quite dark. The values of the hue at their fullest are indicated on both sides of the value scale in figure (a).

Figure (b) on the same plate represents the meaning of the words *tints* and *shades*. The tints of a color are those values of the color higher than its spectrum value. They are obtained by adding white to the spectrum color. The shades of a color are those values of the color lower than the spectrum value. Shades are obtained by adding black to the spectrum color. The tints of yellow and the shades of violet do not find room upon the illustration. That is due to the fact that only ten gradations of value are represented, although the eye is sensitive to much more subtly graded differences of light and dark.

Further Experiments with Colored Slips. If the reader wishes to realize more fully the properties of color, there is a great variety of simple experiments to which the colored slips lend themselves. These experiments practiced under scientific conditions could be made the basis for contributions to local newspapers, in which the reader would record his findings. In this manner the reader though only a lay student of the subject could accomplish more than most of the professional artists in his community ever attempt towards stimulating the habit of color observation and color thinking. It would be very important in any such popular article that the reader who feels that his findings will interest the public should point out the practical applications of the results which he obtains. The experiments which are suggested are in the nature of researches into the psychology of color. The results have practical applications in dress, home and business.

Experiments for the Activity of Color. An understanding of the activity or carrying power of colors is of the utmost importance in posters, meant to carry at a distance, in the choice of colors for stage settings and costumes and in window display. It is also useful in those cases where colors are intended to lose themselves and be least insistent as in the decorations of small rooms, and in camouflage. In the previous text a simple experiment was suggested to test the carrying power of pure violet, blue, green, yellow, orange and red.

As a result it was found that pure red, yellow and orange are advancing colors; pure green, blue and violet are receding colors. This experiment might be supplemented by some of the following.

To test the influence of purity on the activity of colors, the reader can pin up a pure red at spectrum value and grayed reds. He will find that the pure red carries better than the grayed reds. Similarly experimentation with any pure color and the grayer tones of the same color will reveal that the pure colors are in every case more advancing than the gray colors. Even in the case of the "receding" colors, green, blue, and violet, the pure tones will be relatively advancing as compared with the grayed ones.

To test the influence of value on the advance or recession of colors, light and dark reds of equal intensity may be compared with one another. In the varying values of a given color it will be found that the carrying power or advance of the color does not depend upon its value as such, but rather upon the contrast of its value with the background against which it is seen.

If the reader is interested in posters, experiments for the carrying power of different color combinations are very important. These should be quantitative and should be tested on a large number of people so as to get results which would be true for average vision. Let the reader take a number of strips of white cardboard, and pin the slips upon these, five on a strip. Let them be

tacked up at ten, then at fifteen, then at twenty feet and then at greater distances from the subject who is being tested. Shifting the cardboard strips at intervals and turning them upside down, the experimenter can make certain that the colors are not memorized. The relative carrying power of each of these colors upon a white ground can be estimated by the average results of tests on a number of people. The conditions of light and exposure should be the same in all cases.

This experiment can be tried out with the same colors pinned flat upon black or upon any other color. It will be found that the results are quite different, that yellow for example carries much better upon black than upon white. This is because contrast plays so important a part in the carrying power of color.

Tests for Over-stimulation by Different Colors. It has been previously pointed out that over-exposure to a red would call up an after percept in the nature of a second color, blue-green; that over-exposure to yellow would call up blue, over-exposure to green would call up violet; and conversely over-exposure to the second color in each of these cases would call up the first as an after percept.

This as has been explained is due to the over-stimulation and consequent fatigue of those nerve endings exposed to the given color. By a very simple set of tests, the reader can now determine the relative stimulation of the different colors and the time it would take to over-stimulate the eye in

each case. For example to test the stimulation of pure red, time the number of seconds which elapse before steady gazing at the red against white will call up a strong sensation of blue green on the white page beneath. Then test the other colors at their fullest intensity in the same manner.

Though the reader may discover very little difference between the pure colors in this test, the difference will become most marked if he will now compare pure colors with grayed colors of the same hue. It will take much longer for a grayed red to fatigue the eye than it will take a pure red, if one may judge eye fatigue by the length of time which it takes for the after percept to appear. The reason is not far to seek. The grayed color is a blend of two complementaries. It represents in itself an approach to balanced stimulation. But long exposure, when the predominant hue is present in sufficient quantity, will cause over-stimulation and the appearance of an after percept, complementary to the dominant hue. This complementary sensation will, however, be very pale and gray.

Tests for Balance of Weight, Value and Warmth. First test black and each of the different colors in sets of two, holding one slip over the other, so that the full length of one slip shows over part of the length of the other. Let us assume that the full length of black is showing below three inches of pure red. Now move the red slip up and

down until the eye seems best pleased with the proportion of black below to red above. Assuming that the five inches of black now support two inches of red this would be expressed as five parts of black balances two parts of red.

By experiment it will be found that as the red grows intenser the quantity needed to balance the black is reduced. As it grows grayer the quantity needed to balance the black is increased. As it grows darker the quantity needed to balance the black is increased still more.

Tests for Balance as Regards Warm and Cold. The foregoing tests, however, incidentally involve a balance of light and dark, warm and cold, pure and dull. For in combining one color with black or with any other color the eye demands a balance of light and dark, of purer and duller tones, of active and receding colors, of warmer and colder colors.

The previous tests for black and one color might now be repeated to observe how a small quantity of light value color would balance the black, but it would take a much larger quantity of a lower value color. The same tests would demonstrate that a small quantity of a warm color would balance the black, whereas a much larger quantity of a cold color is required. Likewise a small quantity of pure active color, red, yellow or orange would balance the black much better than an equal amount of pure green, blue or violet. These experiments for black and one color could

be carried out for blue and one color, red and one color, and so on, until the reader has established for himself the reality of the principle of color balance.

CHAPTER III

CHOOSING A COLOR COMBINATION

Three Fundamentals in Color Schemes. Some of the principles to be kept in mind in planning a room interior, a gown, a business circular or a poster will now be studied. As it is the author's aim to make the book as useful as possible, even to the reader who has had no previous art training, only the simplest possible statement will be attempted. A more technical statement of the principles treated in this chapter is to be found in chapters XI to XVI.

The designer of any practical everyday application of color is facing virtually the same problem as a painter who composes with colors on a canvas, or as a designer of theatrical settings who composes with colors in a volume. If the contour of a woman's figure is made upon a wall, the silhouette which results is the shape of the canvas which the dress designer has to decorate. If the window decorator would think of his window as a stage which is to be set so as to attract and hold the interest of the spectators who are walking by, he will realize that the stage decorator has, in fact,

an easier problem than his own. But the general similarity of the two problems becomes obvious.

In any event the choice of a color scheme involves the following considerations:

(1) The color scheme should be practical.

(2) The color combination should be pleasant and stimulate the eye agreeably, and it should add to the interest and agreeableness of the object decorated.

(3) The color arrangement should be well planned, so that not only the eye is pleased, but also the mind.

Making a Color Scheme Practical. Colors must be suited to their purpose. They must be adapted to the use of the object which they decorate. They must be suited to the material of that object. They must also be suited to its construction. These three principles are called the laws of fitness. They are considered more fully in Chapter XVI, but the main points to be remembered follow.

Suiting Colors to Purpose of Object Decorated. Objects of humble use should be decorated with sober colors which are quiet and dull. A fork and knife holder will receive simpler color treatment than a jewel case. Outdoor dresses in summer permit of stronger contrasts and brighter colors than winter street gowns.

Color schemes which may have to make their impression at a moment's glance require a clarity and force which would be out of place in a color

scheme which is to be lived with. Colors which must carry at a distance must present stronger contrasts than colors to be seen at close range.

But it is hardly necessary to enumerate all the examples of the need of adapting colors to the use of the objects they decorate. The important point to be remembered is that the very first question to be decided in choosing a color scheme is "What colors would be suited to the use of the object?" This really implies two other questions, viz.: how practical are the colors, and how do they harmonize with the use of the thing? For colors suggest mood, and a color scheme which might be suited to a flower vase or a spring hat would look quite foolish on an engine, not only because the gayer colors would soil too easily, but also because "frivolous" colors are out of harmony with the associations of force in an engine.

Suiting Colors to the Material Decorated. The next consideration in choosing colors so that they will be practical is that of suiting the color to the material. A few applications of this principle follow.

Materials of rich texture very agreeable to the eye are, as a rule, treated much more simply than coarser material. Marble, leather, velvet or jersey are so agreeable as material that elaborate color treatment is avoided because it would tend to hide the surface of the material. It is the hat of cheap straw which demands colored trimming more than the hat of fine texture, which looks rich

even in one color. But the person of limited means can be consoled with the thought that the tasteful application of color to cheap materials may give more artistic effects than a reliance upon rich textures.

Suiting colors to materials implies suiting the colors to the technique which the material makes necessary. Leather permits of cutting, tooling, pressing, stamping and burning. Wood permits of inlay carving, painting, staining and stenciling. A straw shape may be embroidered, painted, stenciled, or just draped. In each case the technique used influences the character of the color scheme.

Suiting Colors to the Shape and Construction of Objects. Under this heading some important points are to be borne in mind. The color accents should be at the points of interest. Whatever is the logical climax of the scheme should receive the strongest contrast of color emphasis. Just as in dress the collar and hat should frame in the face through a strong contrasting note, so in a room the color accent should come logically at the point of greatest interest.

In decorating a dress, the shape or figure of the wearer must be considered and color accents must be avoided at weak points. Thus a woman whose walk is poor should not be gowned in a dress with decorative accents at the hips or below. The simpler her skirt is, and the more positive the contrast in her hat and collar, the less noticeable will be her defect. A large room which is to be made

more intimate in appearance can be reduced through stronger colors in wall and ceiling and through more contrasting patterns.

The applications of the principles of the fitness of color are numerous, but the whole subject of the harmony of the color scheme with the practical requirements will here be summed up again in the three propositions.

1. The colors must be suited to the purpose of the object decorated.
2. They must be suited to the material and to the technique which it enforces.
3. They must be suited to the shape and the construction of the object.

Color Combination. Having decided in a general way upon colors which will be practical and suitable in mood as dark or light, gay or somber, warm or cool, the next problem in color planning is the more definite choice of the colors. Naturally the simplest solution in any case is to have no hue at all. It is a solution many choose in dress. White, black and grays present no danger of discord, and so, many evade the problem of color combination, hiding their ignorance behind neutral grays. But color combinations to be interesting must present the variety which comes from contrasts. To be harmonious there must be some binding unity or relationship within this contrast and variety.

White, black or grays may in given cases be the fitting colors and can even be made interesting

through contrast in the values of the grays employed. But when practical, a note of warm color should be introduced to enliven the effect. The color designer must be prepared, however, to go a step further when necessary and to employ actual hues in a given problem.

Self-tones. Let us say the problem is a room. If it is not to be all white in floors, walls, ceilings and furniture; if it is not to be all black or all gray, or all in contrasting values of white, black and gray, hues must be employed. What is the safest principle for the beginner in color designing when planning a scheme in hues? Let us consider the case of the average home builder, who may be reading this book. He has his furniture, and that is likely to be a starting-point in any scheme he will undertake. The furniture is fumed oak with brown leather upholstered backs and seats. What wall paper, rugs, woodwork, ceiling tones and pictures would go best with these?

The safest and simplest solution for the beginner in the use of hues is harmony through self-tones of one color. This type of harmony, to dignify it by an ornate name might be called monochromatic. With the dark brown oak and golden brown leather, a grayed tan or very light brown wall, an orange brown rug, and a very light, creamy tan ceiling might be used. Fumed oak wood-paneling in the walls, fumed oak frames for the pictures, and very light brown mats might complete the scheme.

Monochromatic harmonies or, in other words, harmonies of self-tones may be made attractive, particularly if care is taken to separate any two tones which closely resemble one another by a third which is strongly contrasting in value. Black can be used with self-tones to separate two light values. White or light grays can be used with self-tones to separate two dark values. In the absence of contrast of hue, the maximum effect can be secured through contrast of values.

Combinations of Related Colors. If the designer becomes bolder and wishes to have an increased interest in the color chord, he may depart from the monochromatic scheme of self-tones of one hue by going one step further and introducing related hues. The hues related to yellow are yellow-green, orange-yellow and orange. The hues related to green are yellow, green-blue and blue-green. The hues related to red are orange, orange-red and red-violet. The hues related to violet are blue, blue-violet and red-violet.

Related colors are colors which adjoin one another in the spectrum. A study of textiles and of nature will reveal that almost all objects which we think of as red or green, present, in fact, a sequence of related colors. A red velvet hanging in the sunlight will reveal this transition from orange, where the light strikes it fully, to orange-red, to red and then to red-violet in the shadows. A green leaf will reveal gradations from yellow-

green to green, to blue-green and then to blue in the shadows.

Related colors are not much more difficult for the beginner than self-tones. If the reader will use the colored slips he can plan a scheme in self-tones of different colors. Then he can introduce into the scheme one or two related colors and observe the effect. The color interest is immediately increased by the introduction of the additional hue or hues.

A scheme of self-tones is weak in one respect. It is all warm or all cold, all active or all passive. The introduction of related hues, it will be noticed from the colored slips, hardly improves this weakness, as the related colors are very much like the self-tones in this respect. The blues and greens are cool, and yellow-green is only moderately warm. Yellow, yellow-orange, orange and yellow-green are all more or less warm.

Color schemes based entirely on self-tones, and schemes based on related colors are both likely to prove lacking in an interesting contrast of color qualities. To obtain the contrast of warm and cool colors, of active and passive colors, it becomes necessary to resort to complementarism. Moreover, any combination of pure colors not based upon complementaries is likely to prove tiring, except in a detail or accessory in a larger scheme, because there will be an over stimulation of just one set of nerve endings.

Complementarism and Color Combinations. According to the law of complementarism it is necessary for hues to be combined in given pairs if the eye is to receive a balanced stimulation. Yellow and blue, red and blue green, green and violet were seen to be three such sets of complementaries. We have also seen that these sets each presents a contrast of qualities. In each pair of complementaries there is a contrast of warmth, of activity and of weight. These contrasts make for interest. It would seem then that a monochromatic color scheme may be satisfactory in a single couch cover or cushion, that it may even be fairly pleasing in a room, but that in large areas the danger of monotony through lack of contrast, or of over-stimulation through oneness of hue, suggests the wisdom of introducing a second color, preferably a complementary.

Contrast in Color Combinations. But the strong contrasts which are present in pure complementaries make these very dangerous for the beginner. If a pure yellow by itself fatigues the nerve endings so that blue is called up; and a pure blue by itself so fatigues the nerve endings that yellow is called up, large areas of pure blue and yellow, though they balance theoretically, will actually fatigue all the nerve endings. In a poster upon which the eye will not rest long the stimulation and force of pure complementaries is desirable, but in a room or in a dress it may be neces-

sary to reduce the contrasts in the complementaries. Even in the small areas of the colored slips, experiment will demonstrate that a pure blue and a pure yellow are sharp and irritating in contrast.

Modifying the Contrasts of Complementaries. The means which can be used to keep complementary colors less sharp in contrast should be known. The complementary colors can be chosen in tones about equally dark or light, so that although they contrast in hue, they do not contrast in value. A dark blue and a dark yellow, or light blue and a light yellow are not as exciting as a light yellow and a dark blue, though equal purity of color is present throughout. The complementaries can be chosen in tones both of which are grayed. A grayed green is grayer than a pure green because it has red in it.[1] A grayed red is grayer than a pure red because it has green in it. Therefore a grayed red and a grayed blue green, though they present a contrast of value and hue, are really much closer in hue than a pure red and a pure blue green.

In actual practice the red may be grayed by spotting its surface with blue green; the blue green can be grayed by spotting its surface with red. This becomes clear when we imagine a yellow couch cover and a blue wall paper. Blue cushions on the yellow will gray it and bring it closer to

[1] See plate I for an explanation of this fact.

the wall. Pictures, yellowish in color tone, will gray the wall and bring it closer to the yellow of the couch cover.

Color Combinations and Simultaneous Contrast. The law of simultaneous contrast furnishes many other facts useful in deciding upon color combinations. Some of the principal points to be remembered are these:

1. Complementary colors like blue and yellow tend to enliven and enhance one another. This is most useful in selecting trimmings for a hat, colored ink for a tinted stock, the background for the display of goods in a window.

2. Related colors like yellow and orange, if there is little contrast in value, tend to deaden one another, that is, if both are light or both are dark. They also tend to over-stimulate one set of nerve endings, just as yellow alone would.

3. Pure colors tend to deaden a grayed color unless the grayed color is complementary. Pure yellows, therefore, do not combine well with dull reds or dull oranges or dull browns. A pure yellow enhances a dull blue.

4. Light colors and dark colors combined enhance one another and are eye-stimulating.

5. When complementaries are combined and each is strong in intensity (or very pure) and one is low in value while the other is high in value, the maximum effectiveness or liveliness is achieved in the scheme. But we have seen that there is danger in such combinations and that for most

purposes it is best to employ complementaries somewhat grayed; or, if pure, either in the very low or in the very high values of each.

The Importance of the Color Chord. It will be seen in the next chapter that there is much more to color designing than just color combination; nevertheless the choice of a good color chord is most desirable as a starting-point. The personal quality in a dress, a room or a store window will depend largely upon the distinction, the simplicity, the novelty of the color combination. Observation of nature, of art, and of choice examples in the special field in which the designer is interested is most useful. The word "chord" describes very well the nature of a good color combination. Assuming that the colors are well chosen and practical, they must combine as well alongside of one another as the tones of a musical chord. Just as a chord of five notes may sound discordant, because one is a flat instead of a sharp, so a chord of five notes of color may look wrong because one of the colors is too dark or too pure. To store up a collection of good color chords requires observation and experiment; also a handy note book in which to jot down interesting effects.

In dress, home and business, in nature and in the fine arts the reader should constantly be alert for interesting color chords. Observe the agreeableness of self-tones, and how value contrasts enliven them. Note the warmth or coolness of related colors; see how striking are the schemes

based on pure complementaries. In nature observe the self-tones in a gray cloudy sky, the softness of grayed violets and grayed greens at twilight, the shriller contrasting color chords of midday. Watch a landscape become suffused with an orange glow in the late afternoon in summer; with orange-greens in the foliage, orange-yellows in the rocks, orange-brown in the tree trunks, a tinge of orange even in the white clouds in the eastern sky. How appealing and intense is the deep blue sky enhanced in its blueness by the warm glow of the sun playing upon the forms of hill and valley. In spring observe the delicate harmonies of a spotting of light yellow-greens against the blue grays of the atmosphere. In the garden see the gray notes of yellows, oranges and reds against the blue-greens of the foliage. The reds, oranges, browns, and grayed violets of fall afford many a deep rich warm chord. Sea-shells give hints of the possibilites of yellows, creams, grays and pinks.

If there is a convenient museum or even a good library at hand, the study of color in historic ornament, Oriental rugs, Persian illumination, Chinese paintings, modern posters, costume designs and stage settings by the newer men are all stimulating and valuable and should be studied with colors and pad handy to make records of novel and pleasing combinations.

In addition to observation the colored slips supplemented by a collection of samples of textiles,

wall-papers and similar material, can be used for an occasional half hour's play in the selection of schemes of grays, self-tones, related colors, and complementaries.

CHAPTER IV

THE ART OF COLOR ARRANGEMENT

The Three Aspects of Color Designing. It has been previously mentioned that the designer who wishes to make an art of color expression has to bear in mind three distinct aspects of the color problem. 1. The colors should be fitting, both as regards suitability to the practical needs and to the mood of the object to be decorated. 2. The color combination or color chord should be agreeably related in its color notes, and should present contrasts either of light and dark, of warmth and coolness, or of advance and recession. 3. The third phase of the color problem is color arrangement.

A color scheme may be practical, it may be pleasing in combination, and yet prove very unattractive, if not annoying, in application. Ten men designing the same room with the same color chord as a starting-point would produce entirely different results. Though the colors would be the same, the effect might seem absolutely discordant in one room, fair in some, good in others and exquisite in only one case. The difference in effect, assuming the textures to be equally interesting,

would be due to the differences in color arrangement, color organization or color composition.

The General Principle of Color Arrangement. The underlying principle is as follows: the mind as well as the eye is pleased by a sense of order. *To be interested the mind requires a planned variety and contrast. To be satisfied it demands a unity or binding likeness within this variety.* Though a bird's notes may be agreeable, we do not think of them as art, because the art of musical sounds requires a planned arrangement of agreeable notes or chords. Similarly in color, the most pleasant colors as such will not arouse the æsthetic emotions to the same degree that they will when organized. The musical composer working with sounds plans his arrangements on principles of selection, grouping, contrast and variety, elaboration of detail and climax. The color composer working with color notes can do the same. If color-expression is to be placed on a plane with the other arts, the part played by color composition must be recognized. The forms of color arrangement which are means towards a satisfying likeness within an interesting variety are color rhythm, color balance and color proportion.

Color Rhythm. Rhythm in color refers to the feeling of related motion which can be secured through certain arrangements of colors. This feeling of related motion is a great source of pleasure to the eye and to the mind.

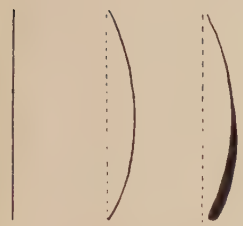
Even a vertical line suggests motion. But a

curved line definitely related to a chord conveys the sense of motion in a more compelling way. The curve (figure (c) on Plate IX) which combines a gradual increase in width and darkness of stroke is still more suggestive of movement. Parallelism or the repetition of a given movement accentuates the feeling of motion as in the wave movement of figure (d) on Plate IX and the angular slant motion of figure (e) on the same plate.

The effect of movement which is secured by the gradual change in value, hue or intensity is called gradation. On Plate X the rectangle (a) represents any one of the colored papers held flat. Take one of the experimental colored slips, a pure blue for example, and roll it around a glass so that it presents the effect of a blue cylinder. Observe how much more interesting the color becomes. There now enters into it, in place of its former monotony of surface, the variety which comes from a gradation of its values from lighter to darker blue, and of its intensities from pure blue to gray blues. Gradation may be secured by a gradual increase in values from light to dark, in intensities from pure to gray, or through a gradual change in hue as when blue passes through blue green to green. This last effect can be illustrated by holding the blue cylinder near one of the blue green slips in such a way that the green is reflected into the blue. These changes when limited to a very small range, as in the gradual darkening of a wall away from the window, are represented

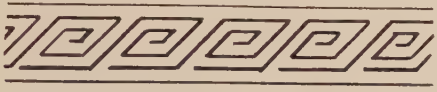
COLOR ARRANGEMENT

LINE AND SHAPE RHYTHM

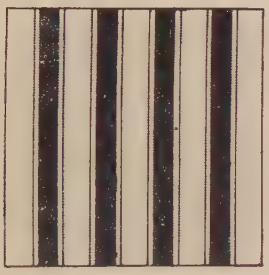


a b c

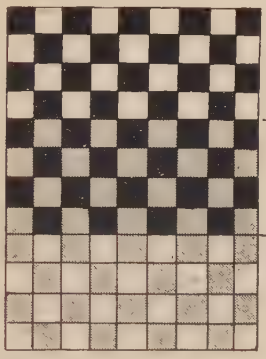
d PARALLELISM SINUOUS



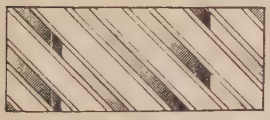
e PARALLELISM ANGULAR



f VERTICAL PARALLELISM

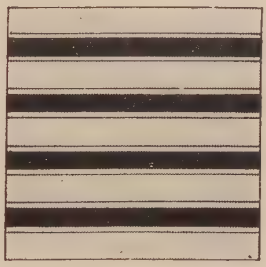


g CHECK PATTERNS



h STRIPING AND GRADATION

i PLAID



j HORIZONTAL PARALLELISM

(a)(b) and (c) Related movement in lines. (d) Line movement emphasized through parallelism. (f) and (j) Optical illusion through parallelism; which is broader? (h) Parallelism accentuated by gradation of values. (i) Variety in line movement.

by figure (b) on Plate X; figure (c) represents these gradations in a more rapid movement and through a larger span as in many of Rembrandt's compositions. One reason why some textures are more appealing than others is explained in part by figure (d) which represents the gradation of values observable in soft folds.

A very useful application of the principle of gradation, is cold painting, a process whereby a wall is so colored that although the effect is green, this green is mottled over with a softly graduated and blending complementary somewhat darker than itself. This is very useful on large walls, as it prevents the distress and monotony of flat colors, and at the same time satisfies the eye through the presence of complementarism.

That colors darker than the atmosphere tend to grow lighter towards the distance, and colors lighter than the atmosphere tend to grow darker are principles illustrated in (f) and (g). In both cases, whether the colors grow lighter or darker as they recede, they will simultaneously grow grayer towards the horizon. In other words (f) and (g) if in colors would present a gradation of intensities as well as of values.

Movement through Increased Area of Color Masses. On the same plate figures (h) and (i) represent color movement through the gradual increase in the size of the lines or color masses. The sense of movement which comes from a gradation both in the value and in the size of the color

masses is illustrated in figure (i). In designing beads, buttons, pleats, horizontal paneling, etc., this principle of movement through gradual increase of color areas can be employed.

Color Movement through Repetition. The sense of color movement can also be introduced through striping as in figures (f) and (j) on Plate IX, through a combination of striping and gradation as in figure (h), through checking as in figure (g), and through all over patterns of conventionalized or geometrical units. These methods create a related motion through the alternation of the accented note of the pattern and the silent space of the ground, just as does the rhythm of accent in music.

On Plate IX the figures (f) and (j) illustrate the influence parallelism has in accentuating motion. It becomes apparent that repeating horizontals emphasize width and make a form seem broader; repeating verticals emphasize height. Similarly parallel angular line movements as in figure (e) accentuate force; parallel soft curves as in figure (d) emphasize grace.

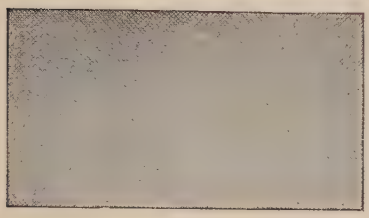
The check pattern on Plate IX though rhythmic is very trying on the eyes because of the shifting muscular movements to which it gives rise. Check patterns are very lively, but they are likely to annoy. Two modifications are indicated in which there is a reduced contrast in the checks.

Color Balance. A color scheme should present contrasts and it was seen how, purely from the

COLOR ARRANGEMENT

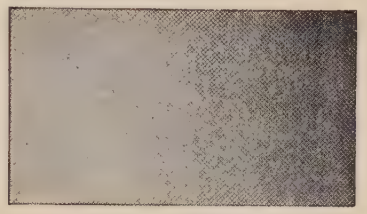
RHYTHM THROUGH GRADATION

a



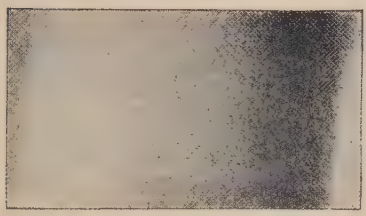
FLAT TONE

b



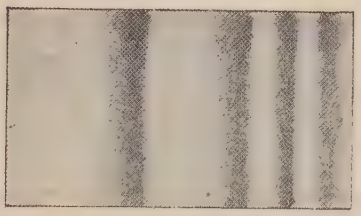
SLIGHT GRADATION

c



MARKED GRADATION

d

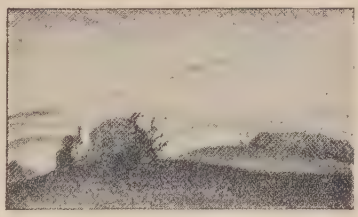


GRADATION IN FOLDS

e

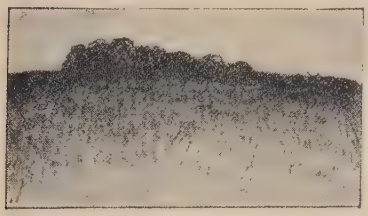
MOTTLING

f



GRADATION IN LANDSCAPE

g



GRADATION IN LANDSCAPE

h

i

GRADATION OF SIZE

(a) Uninteresting. (b) Roll colored slip around a glass and this effect appears with resulting increased color appeal. (c) Principle of chiaroscuro (d) Clue to color interest of textures. (f) and (g) Gradation and illusion of distance. (h) and (i) Gradation of measure emphasizes line and color movement.

point of view of color combination, it is desirable that colors should be balanced in light and dark, cool and warm, active and passive tones.

But a color chord which presents such a balance still depends upon arrangement if it is to realize the fullest pleasure which it can afford. *Balance in color composition refers to the arrangement of the colors on such a plan that the interest is centered and the effect of poise or stability is secured.*

Analysis of Plate XI demonstrates that a flat color, figure (a), is monotonous. Two colors in separate areas, no matter how agreeable, are likely to create a rivalry, figure (b). The greater the contrast in hue and value the more pronounced is this rivalry. Such a scheme excites the attention but it also irritates it. The eye keeps shifting from the one color to the other, particularly if both are active and intense. The result is a lack of poise or balance although physically speaking the colors may be perfectly balanced.

On the same plate figures (d), (e) and (f) illustrate another phase of balance in spotting. A pattern, whether of conventionalized units, or of geometrical spots which is in strong contrast with the field is likely to disturb the sense of balance through detachment from its ground. It is insistent, jumpy and isolated. When these spots are repeated over a large area they can become most irritating. In figure (e) it is seen how a band of lines binding these spots into one broad moving border decreases their detachment and

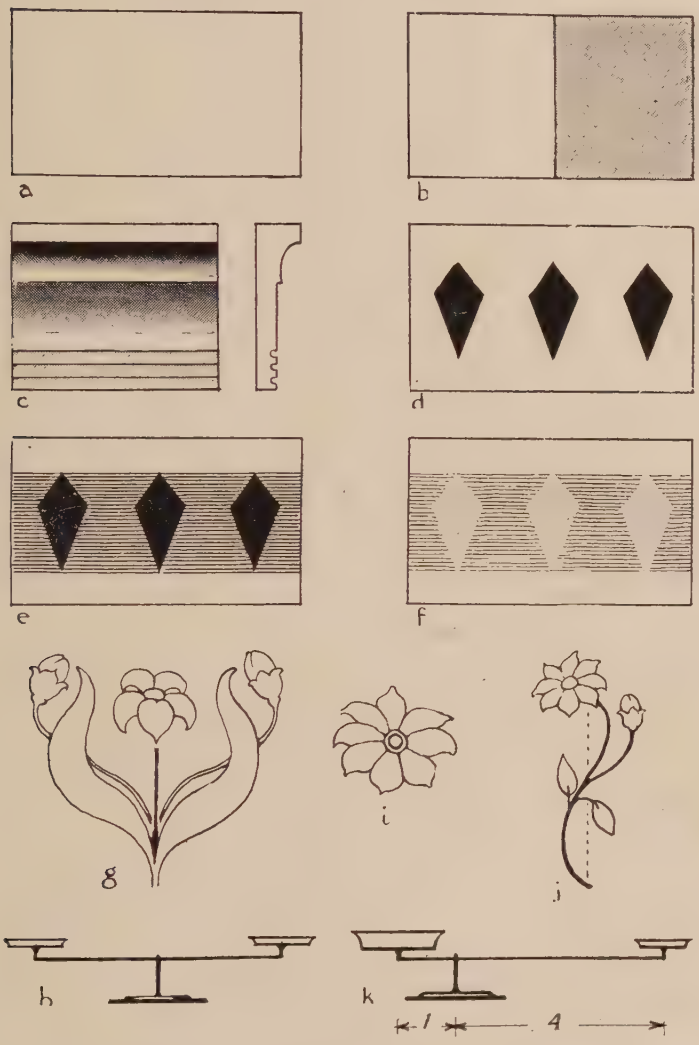
helps make for balance. In figure (f) the detachment is still further reduced through the reduction of the contrasts.

On Plate XI figures (c), (d), (e) and (f) represent the effort to bring about an interplay of the two colors in figure (b) to eliminate their rivalry. A skirt and waist in strong contrast present the same effect as (b). This can be improved by using the skirt material for cuffs and collars on the waist, thus creating an interplay of the two notes and binding them. Though this spotting of the darks on the waist may be thought to resemble the spottiness and detachment of figure (d), it is not necessarily objectionable, for no matter how strong the contrast it is concentrated at points of interest. The "jumpy" effect which is to be avoided comes from a strongly contrasting note repeated over an area, as on a border, or a pattern for dress goods, wall-paper or a rug.

On the same plate figure (g) represents the balance which comes from the opposition of shapes and colors on both sides of a center line. This extremely formal type of balance is called symmetry and is best illustrated by a pharmacist's scale, figure (h). Figure (i) is an example of radiation which takes a number of forms, the essence of all of which is the equal grouping of units around a center. Figure (j) exemplifies informal balance, in which the distribution of interest is not quite so obvious as in symmetry or in radiation. The interest however must still be so

COLOR ARRANGEMENT

COLOR BALANCE



(a) Flat color, monotonous. (b) Rivalry. (c) Unity within variety. (d) Detached spotting, "jumpy". (e) and (f) "Jumpiness" eliminated by introducing unifying elements. (g) Symmetry (h) Scale illustrating symmetry. (i) Radiation. (j) Informal balance. (k) Scale illustrating informal balance

adjusted that the design balances at its center. Figure (k) illustrates the principle somewhat crudely in a scale with uneven arms, on which a larger weight of interest at or near the center will balance a smaller weight further removed.

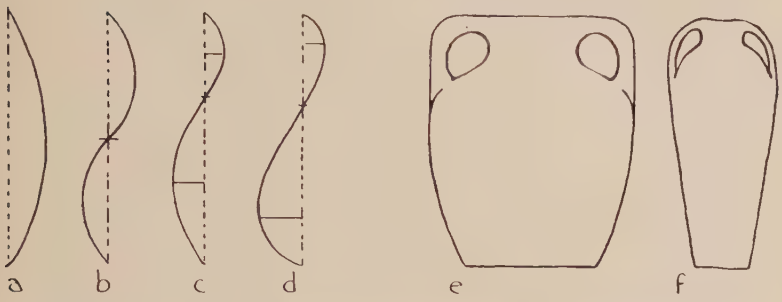
Proportion in Color Arrangement. Proportion in color composition results from an arrangement of colors on such a plan that there is a feeling of relation in the variety of their measures. The moment a line is curved there is introduced an element of measured relationship. In the simplest arc (a) on Plate XII there is the proportion of the length of the curve to its depth. In the double curve (b) besides the proportion in each of the elements of the double curve there is the proportion of the upper to the lower which is 1 to 1. In (c) this proportion is changed to 2:3. This change increases its interest. There is still unity, but there is more variety. In (d), the point at which the greatest width occurs is changed in each section of the curve, so that still further variety enters. The effect is a still greater interest. The author cannot quite follow the Greeks in their plea for the golden mean, and an absolutely mathematical formula for proportion (the Golden Mean was approximately 3:5), but these curves should demonstrate that a line increases in its gracefulness, in proportion to the elements of contrast and variety, when these are so combined in its measures that the effect is nevertheless a unity.

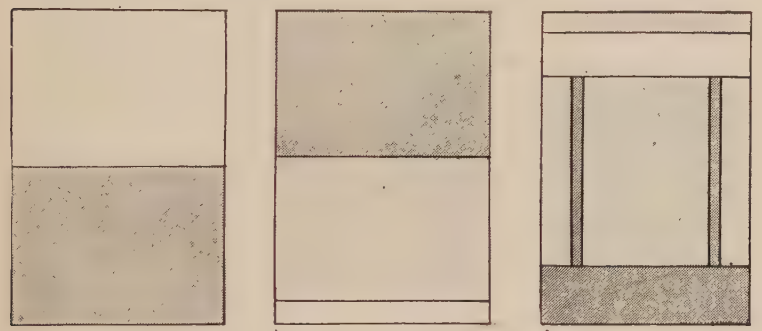
Figure (e) illustrates a vase combining curves of long and short arcs. Figure (f) illustrates a long slender vase of sinuous curvature. These two can be used to illustrate a very interesting point made by the proprietor of a famous pottery firm. In the course of a conversation, on the chemistry of color in pottery, he remarked that a change in the shapes of some of their more recent vases had made necessary a change of color scheme. Pointing to some vases more or less like (f) in shape he explained that the typical delicate pastel tints and shades of Rookwood wares which suited the "feminine" hues of such vases had to be abandoned as incongruous for "masculine" forms like (e). The chemists therefore had to experiment with "masculine" colors. All of which was an interesting way of expressing the thought that colors should harmonize with the shape of the form they decorate.

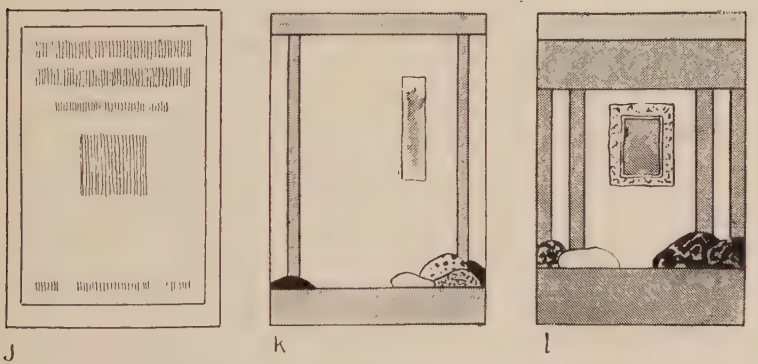
In figure (g) a vertical panel is divided into halves. This makes an uninteresting relation of measures, whether in a landscape, a door panel, a wall panel, or in a border-band for a vase. In figure (h) three bands, white, black and gray, illustrate not only an uninteresting relation of measures but also top-heaviness. Figure (i) illustrates interesting variety in the measure relations, in which the different oblongs are agreeable in their variety, and each rectangle considered individually has pleasing proportion of width and height.

COLOR ARRANGEMENT

PROPORTION IN COLOR







(a) (b) (c) (d) Grace through variety in line proportion. (e) (f) "Masculine" and "feminine" proportions. Spacing in (g) uninteresting. (h) Is vague in spacing. (i) and (j) Interesting space relations. (k) and (l) Illustrate mood in proportion, slender grace versus heavy dignity

Dominance. Elaboration of Detail vs. Simplicity. In color combination and in color arrangement the scheme looks best when the decorator has a clear idea in mind and develops his plan so that the idea carries. A color combination may be warm, cool, high pitched, somber, chaste, simple, severe. A window display of hats may be planned as a spring poem in colors. Starting with this idea, the designer would choose a color combination which would suggest spring. This might be accomplished by a blue grayed hanging against which a tracery of cherry blossoms would frame in the one dominant note of a richly flowered hat. The result would exemplify a dominant idea carried out with simplicity.

This simplicity is an ideal worth while, but it must not be misunderstood to mean monotony and emptiness of interest. Just as the great composers in music attain a strong and simple dominance of effect, through the very repetitions of the theme with elaboration and variation of its detail, so the color composer can compose, combining a strong central dominant idea with interesting elaboration of detail in the accessories. In many color problems there are opportunities for this combination of rich variety in detail with simplicity of central mood. The design can be so planned that all the details of line and color carry the eye by simple and easy steps to the climax of the composition. See Plate XIII to compare symmetry and informal balance, for the opportunities of combining

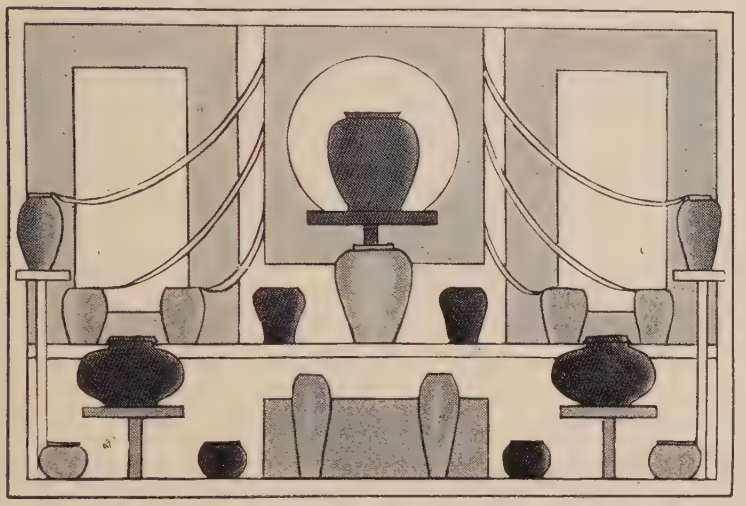
dominance with variety and elaboration of detail.

Mood in Colors and in Color Arrangements. Chapter XVII contains a study of color moods with the emphasis on individual colors as such, but this is a limited view of the subject. For though individual colors affect us in various ways, it is in various combinations and above all in various arrangements that the fullest emotional suggestiveness of color is called forth. In the chapter referred to it is pointed out that light colors seem gayer than dark colors, warm colors seem more stimulating than cool colors, pure colors seem more exciting than grayed colors. Dark colors seem sombre, mysterious, sedate, sober, stately. Grayed colors seem sophisticated, melancholy, tender.

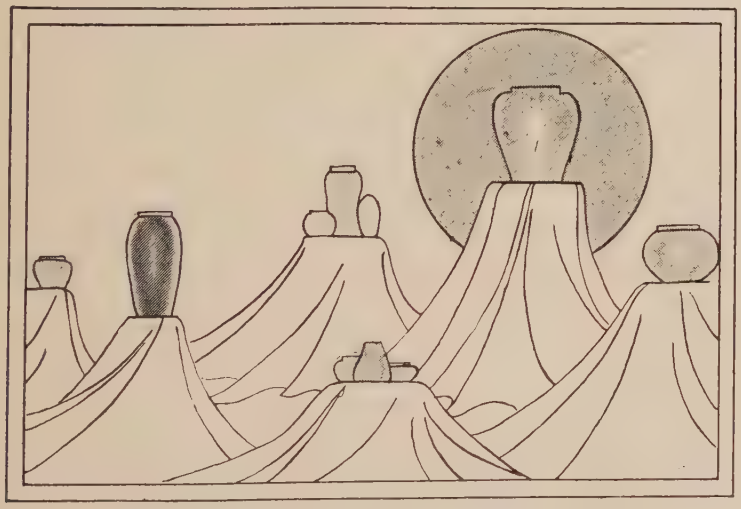
But these qualities of the different colors will depend largely on the combinations and the arrangements in which they appear. Yellow and orange in broad swirling curves on a dark ground would look flame-like and dramatic. The same yellow in an embroidered cross stitch on a blue color would create an effect similar to a pizzicatto passage played on the violin, against a broad obligato background.

Much of the mood depends on the light and dark contrast in the colors which is a prime means to dramatic effect; on the shapes of the color masses which may range from a soft legato curve like the meander, to an angular staccato effect as in an

COLOR ARRANGEMENT



a FORMAL BALANCE SYMMETRY



b INFORMAL BALANCE DOMINANCE

These are purely schematic illustrations of two types of composition. Dominance and subordination are exemplified in the distribution of the elements. Most color problems can be composed on the model of (b) with greater opportunities for interesting effects.

angular silhouette sharply detached from the ground or field.

Tender moods are evoked by gray and grayed hues such as soft blues, combined with delicate yellow greens, pale pinks and blue-greens, light violet and light gray green.

Cool light grays without a balance of warmth are likely to seem elusive, over-subtle and lacking in vitality. Warm grays without a balance of cool are a trifle saccharine and too scented in suggestion. Yellow oranges and reds in pure notes will give a flushed effect, over hot and irritating. Cool colors, pure blues, greens and violets in low tones seem oppressively cold in suggestion.

For special purposes it is sometimes desirable to depart from the balanced harmony. If the designer wishes to suggest an exotic and tropical effect, he may deliberately compose in hot tones without a proper balance of blue. If it is his object in a poster for a play or the cover for a book to suggest the element of mystery and terror in the plot, he might deliberately choose shrill high value blue greens and black.

CHAPTER V

COLOR IN DRESS

Self-expression in Dress. Color, like music, may be studied either for the possibilities of enjoyment which it affords, or for the sake of self-expression. But unlike music the opportunities and the occasions for self-expression in color are more intimately associated with the needs of daily life. There is an almost constant demand upon the individual to make choices of color in dress, in the home, in business detail; selections which are self-expressive since they may reveal cultivation and taste, or on the contrary a lack of judgment.

Few people are in the habit of thinking of themselves as artists in relation to that part of their environment which they themselves help to fashion, but when a woman plans a gown she is building up a picture in which, just as in a painted picture, or in a cathedral, the masses, the lines and the colors must be well organized, rhythmically balanced, proportionate and fit. The fact that the average woman does not actually make her own clothes does not completely militate against self-expression nor does it entirely relieve her of responsibility.

For it is in the choice, in the assembling and in the arrangement of color effects that the artist in dress can still reveal herself. The painter does not grind his own colors, nor does he prepare his own canvas. The colors he works with have a range of light and dark which is quite limited compared with the range of nature. But it is in what he actually does within the limitations of his pigments and their qualities that he stands revealed. So in dress it is within the given limitations that the individual may still find means of revealing character and taste.

The ultimate test for each of us must be either the expert, or our own trained judgment. The personal advice of the expert is expensive and in any event the slightest untutored addition made by the wearer might completely spoil the effect. The adventure and joy of color expression are missed by those who walk in color combinations decreed for them by specialists, or who live in homes, every detail of which has been arranged by professional decorators. There is the distinct pleasure of creation in designing one's color schemes upon a foundation of observation and experience, and there is joy in the sense of growing skill. If this worth-while skill is to be acquired, the training of the eye and mind must be undertaken, not necessarily as a task but in a spirit of play.

Cultivating Observation in Dress Harmonies. People interested in dress will find endless pleas-

ure in analyzing the color schemes of those opposite them in cars and subways, on the street, the boardwalk, or the beach. Any fairly well-gowned woman may be selected for observation, and her clothes judged as a color composition in relation to her face and figure. How could the errors have been avoided? How could the result even as it stands be helped by the removal of a detail in trimming, a change of color in the hat, or the addition of a color note in sash or collar.

Just as painters go to the art galleries to study the masters and the works of their contemporaries, so must the woman interested in dress criticize the dress creations of the leading designers with a conscious application of color principles.

The woman in search of interesting color schemes should, however, go further than the field of dress. At the art museums, looking at the draped statue, she can sensitize her eye and train her judgment to the possibilities of rhythm in draping. In the master paintings old and modern she can obtain hints about color organization from Vermeer, Titian, Veronese, Whistler and Monet. In the pottery, tiles, enamels, and rugs she will find many strange and effective color chords which she can adopt for her purposes. In the coloring of nature likewise, in flowers, in leaves, in seashells, in butterflies, the searcher has ample opportunities for noting harmonies exquisite and suggestive.

Dress designing, just as any other practical application of color, involves considerations which

have been treated in Chapters II, III and IV. The principles of color fitness or adaptation of color to use, to material, to shape and construction; the principles of color combination, the principles of color arrangement, all apply. In the earlier chapters these principles were stated in their general terms. This chapter is devoted to a study of their more specific applications to dress.

Making a Color Scheme Practical. A color scheme which is harmonious in its choice and arrangement of hues, might nevertheless violate the sense of harmony through lack of suitability. The pure colors of children's summer dresses, hats and socks, which make them look like so many flowers, might be most agreeable as color combination and even as color spotting, but the very same colors and arrangement on the matron of a hospital would offend. The color arrangement which would look well on the tall slim young woman, broad collar, broad sash, broad border band at base, would offend on the short stout woman. Endless examples could be furnished to prove that harmony in an applied color scheme requires more than a unity within the scheme itself. There must be an adaptation of the color scheme to the practical needs and to the associations of the given object.

Adaptation to Use or Function. The age and social position of the wearer; the function at which the gown is to be worn; the season and place in which it is to be "set"; these and many others are

conditions which should be kept in mind in choosing a color scheme.

"The flowers that bloom in the spring, tra la, have nothing to do with the face" is the thought which occurred to the writer when he saw a woman of severe features, stern expression and sallow complexion, bedecked with a hat which was a veritable flower shop. Yet the hat, considered by itself, was not badly designed. A younger woman of rose tinted cheeks, vital complexion and laughing eyes could have carried off its rich spotting without arousing a feeling of incongruity. The woman of maturer years would do well to observe a certain restraint, avoiding frivolous colors and gay springtime effects. A love of warm colors and even of the spotting of pure colors could be indulged without violating the sense of the fitness of color scheme.

Another typical violation of this principle of fitness to function is the theatrical type of gown worn to business by many stenographers and salesgirls. There is ample room for taste and color effect without resorting to the extreme of dance frocks for the working hours. The exquisite textures and flower-like colors would look better in a little spray of flowers on the window sill or desk than in the waist or gown of the girl who is rushed with the details of the day's routine.

A harmony which combines common sense and neatness with agreeable colors in appropriate tones will make a much more favorable impression

on the average business man than will the more purely decorative waist or dress. The endless applications of this principle need not be entered into as they are obvious enough. Yet it is just these obvious facts which are so little recognized and so frequently neglected. A case in point is that of mothers, arrayed in afternoon gowns wheeling baby carriages, and obliged by regard for their dress to handle their own children in a most gingerly manner. They become positively nervous about getting themselves marked with the dust or soil of the carriage wheels, but fail to see the obvious moral, that their dress should be suited in color and texture to its function. If women recognize the need of adaptation of dress to occasion in a dancing gown, why not go one step further and see the value of deciding on a practical gown for the afternoons in the park with the baby? It shows just as poor taste to be ornately dressed in the latter case as to be soberly dressed in the former. The adaptation of color to season has been more and more pronounced of late years. Spring brings forth gay, joyous yellow-greens, yellow-oranges and reds on fields of blue and green. The summer clothes for outdoors to be seen in the blazing sun on beaches or across the fields are rich and pure and boldly combined in their color schemes. The autumn designs are in browns, russets, oranges and purples.

Adaptation of Color to Material. There is so much pleasure in fine textures as such that color

harmony almost takes care of itself when these are used. There are a number of individuals and firms with a nation-wide reputation as dress designers, whose creations rely much more upon the exquisite character of the weaves and surface textures of the materials which they employ, than on the actual quality of the design. The eye is so pleased by these textures that critical judgment is suspended. Those very gowns would be still more enchanting if they presented a more satisfying harmony of hue and proportion to combine their appeals with the appeal of texture.

But the problem for the readers whose means are limited is that of so adapting colors to material that the simpler and less pretentious materials take on maximum interest and effectiveness. Even ginghams may receive such color treatment from the textile designer and such enhancement from the decorative spotting employed by the dress designer as to give considerable pleasure to the eye. The less satisfying the texture is, the more carefully considered must be the color scheme.

Adaptation to Structure. The painter of easel pictures has a space to fill, within which his lines and colors may play freely, with little other structural thought than that of a harmony between the lines and colors themselves. The dress designer is more like an architect designing a façade for a building because there are structural requirements to be considered. There must be a foundation, stories of given sizes, a roof; the structural

lines must be right; the fitness to purpose must be dominant. Within the limitations of the structural idea, the plan is developed.

So the dress designer has the structural facts of the figure to consider; feet, limbs, trunk, waist-line, neck, face and head. Structurally the dress must conform to these facts. And even in color, the arrangement of spotting must bear in mind the fitness to the structure. Dress design may be viewed as a problem similar to the planning of the front face of a building.

The Figure as a Starting Point for Dress Designer. The figure then is the starting point for the dress designer as the figure suggests the logical points for color variety and contrasts. The hat as a sort of roof may vary in color as well as structure, much as Dutch tiled roofing varies from Gothic spires. The neck suggests the collar as a frame for the face, and corresponds in a way to the architrave beneath the pediment of a Greek temple. The waist-line, and the border-bands on sleeves also present analogies to details of the temple design.

Points of Emphasis in Structure. It is a principle of color fitness or the adaptation of color to structure that the color contrast should be placed at the points to be emphasized. As the head is the dominant note in the structure of the figure, so the climax of the dress, the logical area of greatest contrast, should be in the collar and hat which frame it. The hands may be set off by a

contrast in cuffs; a good waist line may receive color treatment which will make the most of its suppleness. When a dress calls for a border at its base, it is a mistake to make this a contrast sufficiently striking to hold the eye long, for this creates a rivalry between the head and the border. Shoes and hose should not ordinarily be rivals of the head in interest, unless the wearer feels a good reason for transferring the interest from her face to her feet.

Variety in Figures. Color and Proportion. It is the first problem of the student of dress design with reference to her own clothes to observe the character of lines and coloring best suited to her structure. Short people, tall people, stout people, lean people, long-limbed, or long-waisted, short-limbed or short-waisted, have special problems to face which only careful observation and training can help them to solve.

There are optic illusions created through line movement, through simultaneous contrast and through the differences in retinal excitement caused by different colors and arrangement which can be utilized effectively in connection with the adaptation of the color scheme to the figure of the wearer.

Under parallelism in the chapter on harmony, it is demonstrated that repeating verticals emphasize height, and repeating horizontals accentuate width. This is only one of the illusions and peculiarities of mental judgment to which color

and color arrangement are subject. These peculiarities of optic response and mental judgment are deserving of much more experimental study than they have received. A number of the points which follow in the sections on color with reference to the weight and height of the figure have not been established according to the methods of experimental psychology. Though based only on personal observation and on the general attributes of color, they may nevertheless be found useful.

The conditions which in the author's judgment may make a person seem longer or shorter, stouter or leaner follow.

Intensity, Value and Proportion. Colors equally warm or equally cold, equally high in value or equally low in value will affect the proportions differently according to their purity. The purer a color is, the more eye-filling it is, and the more likely to accent the girth of a stout person, simply by calling attention to it. Black when dull of texture offers the sharpest definition of contour against the atmospheric gray, and therefore tends more than any other color to shrink the figure.

Plasticity and Proportion. Active Colors. Under the heading of activity in colors it was observed (a) that certain colors like yellow, red and orange tend to advance, while blue, green and violet of equal intensity tend to recede; (b) that the intenser tones of any of these colors were more active than the duller tones; a pure blue of a given value being more active than a dull blue of the

same value; (c) that the higher values, intensities being equal, were generally but not always more active than the lower values of the same color; a high value orange or green being more active and advancing than a low value orange or green equally pure (although in the case of values much would depend upon the background).

It was also pointed out that the activity of colors is used by painters in modeling. Cézanne obtained the fullness of form in an apple or a pear by making the most of this difference between yellow high lights which come forward and grayed yellows which recede through their reduced intensity, followed by lower value grayed blues and green-grays which recede still further, carrying the eye back and around.

This suggestion of the varying activity of colors which the painter may use deliberately to suggest volume, the dress designer may avoid in order to reduce bulk. Light pure warm colors, when draped upon the body take on yellow high lights which advance, duller half tones which recede somewhat and positive blue and green shadows which still further accentuate the movement of planes. A stout arm or bust draped in a goods which is warm and active in color and sensitive to light takes on plasticity just as does an apple by Cézanne.

It would follow that the warm advancing colors, red, yellow and orange, increase girth and that blue, green and violet reduce it. But it must be

remembered that intensity and value are factors and that (a) intense cool notes may become relatively active and plastic by virtue of their intensity and that (b) high value blue greens and violets may become relatively active.

The plastic effect of colors may all be summed up in the one proposition that colors which when draped present a marked progression from light to dark, from warm to cold, from advancing tones to receding tones, make for the feeling of volume. But this plasticity or gradation is partly dependent on textures.

Textures and Weight. Even texture must be taken into account in the matter of plasticity. Dark goods or even black goods if shiny of texture and hard of surface will give the same sharp contrasts of light and dark, warm and cold, as tints of softer texture and they will therefore tend to emphasize bulk. Textures with satin sheen or metal lustre or other light reflecting, eye-filling plastic properties are not meant for the over stout who do not glory in their bulk.

Black satin is favored by the "vampires" of the stage because of its twofold effect in that as black it makes the figure seem additionally long, and as a plastic black, it reveals the modeling of the body and makes the most of its sinuous snake-like curves. Hard textures even if dark will emphasize volume more than soft textures of the same hue and intensity, because the soft textures will fall in long vertical lines, whereas the harder tex-

tures will break sharply, carrying the eye in all directions. Mixtures of lively surface, since they increase retinal stimulation, may also tend to increase apparent volume.

Surface Pattern and Proportion. Parallelism. Heavy people may seem slimmer in a vertically striped goods, if the contrast in the stripes is very slight so that the stripe is felt rather than seen. A positively contrasting striped effect, however, creates too lively a surface for a stout person to wear, as it tends to draw undue attention to the figure. Unless it be vertical striping, surface pattern generally, whether flowered or abstract in spotting, is very likely to prove a poor scheme for the dress goods of stout people.

These will also quite naturally look stocky through the introduction of any horizontal paneling or border bands. All edgings and leading lines should, wherever possible, move up and down instead of horizontally. The cut of the neck and collar is particularly important in this respect. Slim people on the contrary can make the most of horizontal borders and paneling to increase their apparent width if they so wish.

Vertical paneling is another aid to reduced width and can be effectively used by the stout when there is little contrast, between the panels and the body of the goods. Vertical parallelism is possible not only in the effect of the collar and in the skirt, but even in the waist which can be designed in panels. See Plates XIV and XV.

CAMOUFLAGE IN DRESS DESIGN

a

b

c

(a) Vertical parallelism, narrow shoulders, long collars and panel, emphasize slenderness. (b) and (c) Horizontal parallelism offsets slenderness and creates illusion of greater width. Figures (a) and (b) are identical in outline.

Color Combinations in Dress Design. Apart from the practical considerations which govern the choice of color in dress, there now enter the principles governing colors as such. Colors we have seen are forces and as such they are governed by laws which have been experimentally demonstrated. Those experiments which illustrated the principles of eye fatigue through over-stimulation, complementarism and simultaneous contrast should be repeated at this point, from a slightly new angle. The experiments for color combination should now be repeated with the color of the face as one of the color notes. Complementarism and simultaneous contrast should now be considered with reference to their influence upon the face.

But apart from this phase of color combination, the more elementary considerations of type of combination may be considered. From this point of view the progressive analysis on pages 48 to 55 is useful since it demonstrates the sobriety of black, whites and grays, the safety of self-tones, the desirability of a complementary with self-tones, the possibilities of a scheme of two or more colors in related hues, the dangers of pure complementaries in broad masses of each, the desirability of complementaries when properly modified.

The Face and Personality in Dress Design. Though a choice of dress goods must first be planned with reference to the figure as a whole, the face should be the dominant feature in the

plan, just as is the pediment in the Greek temple. The colors should progress in interest as they approach the face; they should frame in and set off the face, enhancing its attractiveness. Under the heading of color observation and criticism, it may now be added that each person should study others of similar type of facial coloring, expression, and figure, in order to get hints from their conspicuous success or obvious failures. For no matter how detailed a study of color in dress the writer may essay, many possible subtleties of color combination and arrangements which an observing person may thus discover escape either classification or description.

Enhancing vs. Supplanting the Face. In applied ornament the object decorated must always retain its character and remain of prime importance. The ornament is secondary, it is intended to enhance the interest of the object, not to supplant it. Thus a wood carving for a chest which completely obscures the function of the chest and becomes so separately interesting as to make one see it as a thing detached, would be over-reaching itself as decoration. The chest and its function as a chest should remain dominant. Dress is in a sense applied ornament and must therefore always be thought of with reference to the figure and face which it decorates. It should, if well designed, enhance the interest of these. Under no circumstances should it supplant these in interest,

CAMOUFLAGE IN DRESS DESIGN

a

b

c

(a) Horizontal parallelism, broad shoulders, wide collar and all over pattern, emphasize width. (b) and (c) Vertical parallelism offsets heaviness and creates illusion of greater length. Figures (a) and (b) are identical in outline.

so that the face and figure become secondary to the dress.

Color Schemes, Character and Auras. Every now and then there appears in the papers an item about the matching of color to the inner characters of people. It would seem, according to the writers, that everybody has an aura, a sort of colored emanation, radiating from and surrounding the physical body. This aura is supposed to harmonize with the character. Miss Beatrice Irwin, in her book, "The New Science of Color," claims that people demand one color or another in their environment, depending upon their state of being. She classifies colors as physically, mentally or spiritually stimulating, sedative and recuperative. Miss Irwin believes that the soul, the body and the mind demand in the colors surrounding them the complement of their own state. Thus a person over-stimulated physically would demand a physical sedative in color. A person over-relaxed and rested spiritually would demand a spiritually stimulating color. So too with mental colors.

Whether or not we follow the believers in this relation between character and color auras or color complements, personal expression and character must be considered very important in determining the kind of color schemes which will best harmonize with the character of the head.

The weaker the face in general character, the quieter must be the scheme. Otherwise the face

is lost far behind the colors which should be framing it. The more characterful the head and personality, the more daringly pronounced may be the color scheme. It takes a very vivacious person to compete with active coloring. It takes a very soft and engagingly youthful face to compete with a sombre black dress and win out on its youthfulness. On the other hand, it may be pointed out that the head which is strong in character requires no strong contrasts; and that the weak and characterless may demand a note of liveliness in their dress design to offset their general lack of magnetism.

Since the face is to be dominant, except for special reasons there should be no strong rivalry created between the face and some far removed spot of color. Thus bright hosiery, a strongly contrasting sash or border band on the skirt, are notes which, though effective in a general theatrical ensemble, as in a ballet effect, are likely to prove trying in an individual costume, where the face must compete with the far removed colors. A rhythm of color in which the eye is led by steps through increasing or decreasing values, or intensities from the feet to the face is a plausible scheme. The use of the richest contrasts in the hair, neck-band or collar to keep the face dominantly framed is also structurally correct.

Difficulty of Classification. If the face, including its color notes of complexion, eyes and hair is an important item in good design, it would seem

advisable to classify people according to facial type and to make suggestions on the basis of such a classification. But this is almost impossible. An attempt at a classification necessarily quite crude is the following:

Type — Hair	*Face*	*Eyes*
1. Light blondes.		
a Flaxen	Ashen grays	Green, gray, blue
b Light gold	Pinks and creams	" " "
c Golden	Yellows, pinks, reds	" " "
2. Chestnut Blondes		
d Golden brown	Any of above	Green, gray, blue, brown
3. Red Haired Blondes		
e Light red	Pale yellows, pinks, greens	Blue, green, gray, brown
f Golden red	Yellows, pinks, greens	"
g Orange red	Orange, reds, greens	"
4. Olive Brunettes		
h Black or brown	Greens, reds	Brown
5. Warm Brunettes		
i Black or brown	Reds, greens, pinks, cream	Black, brown, blue

To complicate matters and make classification still more difficult there are the added conditions of feature, sharp or soft; of expression, forceful or weak; of complexion, vital or anæmic and sallow; of lustre or dullness in hair, all of which should be considered in planning color schemes, which will be truly adapted to their function;—that of enhancing the personality of the wearer.

Simultaneous Contrast in Dress. If the color schemes are to increase the interest and attractiveness of the face, obviously where the complexion is good and the coloring of the face positive, the principle of simultaneous contrast is the one to apply. If at this point the experiments for color contrasts will be repeated the importance of this principle in dress design will be more fully realized. The use of the colored papers reveals that

blue throws yellow into its adjacent colors; and that moreover it enhances yellow alongside of it. Similarly orange or yellow enhance blue and black.

Light golden blondes will then look best in blue-green, violet and their compounds, which set off the rich beautiful yellow warmth of the face and hair. Black-haired brunettes with the deep blue glints in hair and eyebrows will look best in the contrast of reds, yellow or orange and their compounds, high pitched warm colors which will accentuate the rich depth of the blue blacks in their hair and eyes. On the same principle people who are red-haired may wear green, blacks and blue-greens to add through contrast to the warmth and richness of their hair and the glow of their complexions. Chestnut blondes, like golden blondes, may wear blues, greens or violets. But in each case the exact character of the facial coloring and other modifying conditions must be considered.

Angel Harmonies for Blondes. In the case of blondes, the soft featured kind can, if animated in expression, wear almost any color, related or complementary colors, high or low in value. Blondes however should as a rule avoid larger masses of pure warm colors near the face as these are likely to outrival the delicate tints of the complexion. If the values are high and the intensity about the same as the flesh tones the result is an "angel" effect. The lack of contrast makes for softness of effect, and the mild radiance of the face and hair gives that note of heavenly lightness

which Fra Angelico used in his paintings of angels to suggest other-worldliness.

This incidentally is related to the "apparent weight" of colors; the high value tints and grays seeming lighter in weight than low value shades and pure tones. Of course the large figured blonde will not attempt the "angel" harmonies which are incongruous in her case, but will prefer the effectiveness of the darker colors which, while enhancing the head, reduce the figure. The soft featured blonde can also wear black or very dark colors of contrasting hue if instead of seeking a rather diffuse charm in the whole figure, she wishes to make the face dominant and "fetching."

Brunettes and Youthfulness. In the case of people of dark complexion the problem of character in coloring is also present. The youthful brunette, particularly if olive, will look matronly if she wears unrelieved dark colors; for if slim this framing in of her features will make them seem sharp; if fuller of form this darkness of scheme tends towards the appearance of maturity.

Analogous harmony then is as a rule too sombre for the brunette. The warm tinted brunette of creamy complexion if she wears blue, should choose this in the higher values, and of a fairly pure kind. Warmer notes, high pitched and stimulating, are, however more generally desirable because through simultaneous contrast they give a deeper lustre to the blue blacks of the hair. When the type has a glowing warmth of complexion,

flashing eyes and white teeth, the dress goods may be very dark with just a touch of brighter emphasis, rose or orange in the trimmings. As a rule, however, the darker schemes had better be selected among the warm colors, deep reds, oranges, yellows, browns or their compounds, rather than among the cool colors, for the effect of contrast on the hair and eyes.

There is something about pastel tints and odd color compounds in high values which prevents them from going well with the duller browns and blacks of the brunettes of olive type. If the dress goods is exquisitely delicate the face cannot compete. In this respect brunettes differ from blondes who frequently gain from the framing of a delicate pastel tint in the collar or hat which blends well with the pearly tints of the face.

The olive brunette must particularly avoid blue and black near the face as these make it look yellow-green. If she would avoid sombreness she should wear warm colors, not too low in value. If blue or black are chosen, they must at least be separated from the face by a broad collar of different hue.

The Red Haired. Lemon Tinted, Orange and Tangerine. The red haired who are of the tangerine type and who incline to excessive redness of face, if they do not wish to look too positively colorful, must, as a rule, avoid black, which may force the flesh tones to grow over-reddish and flushed; they must avoid intense blues and greens,

even delicate blue-green, cool compounds and black which will intensify this orange glow. Orange-browns and dark reds are preferable to cool colors in these cases. The more delicately tinted "Titian" type in whose complexion creams, lemon yellows, tints of greens and pinks are blended, can wear black or cool colors and their compounds, most effectively. The orange-colored type can generally use either scheme of coloring effectively.

Complexion as a Factor. In general it may be said that the woman of poor complexion has quite obviously an almost impossible condition to face. It is one of the functions of dress from a color point of view to enhance the interest and attractiveness of the face by setting off its quality, but the most that can be done for a bad complexion through color in dress is negative.

A sallow person should not wear blue, for that would emphasize the yellows in the face. Black also tends to make a sallow face more yellow. Almost any warm color considerably grayed and not too dark, is preferable to a cool blue or blue-violet which emphasizes the yellow in the face; or to a very dark color, even though warm, which emphasizes its pallor. Dulled green will tend, if lustreless in texture, to offset the yellowness of the face by emphasizing whatever little flush of pink there may be in it.

Faces which are ashen or gray green, and lacking in lustre or vitality, without being quite sallow or yellowish, must on the other hand avoid pure

warm colors which accentuate lack of vital warmth. Such people look best in dull greens not too dark, or pure or shiny. The intenser the color of the dress the more lack-lustre will the face seem. The rivalry will be too much for it.

The problem of those who have poor complexions is not simple but there are two remedies, a quick one and a slower one. Rouge and paint is one way of meeting the difficulty, by actually heightening the color of the face so that it will hold its own alongside of the color of the dress. The other method hardly comes within the problem of a book on color, though it may be mentioned in passing as worth consideration. It is to find the way of health and to secure a natural cleanliness and vitality of complexion.

The purer the complexion and the richer the coloring the more positive may be the contrasts indulged in and the purer may be the hues. One exception to this, however, is in the over ruddy, particularly when the complexion is somewhat rough of texture. In these cases the use of black or of complementaries is poor because simultaneous contrast may tend to make the face seem flushed or even coarse in its fullness of coloring. Such persons as a rule look best in analogous harmonies such as orange browns, and other related colors with touches of pure red, pure yellow or pure orange, for these will tend to soften the radiance of the face while preserving the appearance of general vitality. If pure colors are used,

rough textures, coarse in weave are desirable because the broken texture will tend to reduce the intensity of the colors creating a vibrating middle intensity and value. Incidentally, too, the rough textures make the complexion seem finer.

Softening the Features. The collar, in its exact quality as color and in its shape plays an important part in relation to the features. A design which frames the face in a severely contrasting color accentuates the edges.

In the case of the sharp featured who do not wish to make the most of their strength and character of expression it would be advisable to have very little contrast at the neck, using a collar which in its soft and blending hues makes the most of the face as color. Such a collar will soften the lines of the face. To demonstrate this principle place a yellow square on a light gray background and then place it on a dark blue or black or gray. The edges of the yellow square become sharply defined when the value contrast is strong; and the yellow becomes a detached and strongly insistent note. In the same manner a face which is framed severely becomes the more completely detached and is subjected to a closer criticism of its features.

Intensity of Colors in Dress. Broadly speaking intense colors, particularly, intense advancing high value colors, like yellows, oranges and reds, should be used only for trimmings and accessories, while the same colors grayed, or the receding col-

ors pure or grayed and of low value should be used for the large background masses of the dress goods itself. But in practice fairly pure yellows, oranges, reds, intense blues and greens may be worn by the vivacious types if slender of figure, provided only that the texture is such that the color is broken up by its folds, by its transparence, or by its own roughness of weave.

Where the dress goods is grayed and subdued, the use of bright spotting must be carefully considered. In such a case bright spotting in hosiery or footwear creates a foolish rivalry between feet and head. The character of the feet like the character of the face has a bearing in the local color scheme. It is obviously a mistake to use colors in shoes or hosiery which focus attention upon a foot which is large or upon an ankle which is heavy.

Recently the author observed a woman whose figure was especially disproportionate below the hips. Her walk was ungainly. The coat she wore had a broad band of orange and red embroidery as a border near its lower edge. This attracted the eye to just the very defect in her figure which the designer might well have sought to keep inconspicuous.

Value in Dress Color. The relation between value and the character of features has already been considered. A dark edging at the neck makes too severe a frame for a sombre olive skinned brunette or for a sharp featured blonde. White when soft of texture takes on grays and

has the effect before mentioned of setting off the delicacy of the flesh tones. White, or preferably high values of any of the hues complementary to the complexion, are useful in collars, particularly when the features are sharp, for they soften the lines and bring out the delicate notes in the complexion.

Value is, like purity of color, one of the prime sources of contrast, and therefore the spotting of the light notes on a dark tone, or of dark notes on a light tone, must be carefully considered. For value contrasts tend to make the smaller contrasting notes jump, and jumpy spotting creates a rivalry for the head to contend with.

Rhythm in Dress Color. Color Composition. Although it was previously advised in this study of color in dress that the general chapters on color composition be considered, a few additional considerations on the special applications of those principles to color in dress may be in place at this point.

The relation between color harmony and orderly arrangement can be illustrated in the adaptation of a color scheme to a figure. All that was said about white and black, cool and warm, in their influence on the appearance of stoutness or slimness would be incomplete without considering the type of pattern or color arrangement best suited to each type.

Under rhythm of color it was seen that striping, checking and plaiding were types of repetition

in color arrangement. The repetition of horizontal panels or stripes tends to reduce height. The repetition of vertical panels or stripes tends to increase height.

It would follow that not only does this principle apply in the choice of patterned dress goods, but also in the treatment of collars, sashes, borders and panels in solid colored goods. For the short person, wishing to increase height, particularly if inclined to stoutness, the horizontal lines are not desirable. In such cases it is best to design the collar so that its lines, like the lines of the whole dress, pull downwards. Useful also, on the short and stout, is a long paneling at the sides from the hip down, with little contrast in value.

On the other hand, the tall slim person who wishes to reduce her apparent height can avoid vertical striping in panels, and can use instead belts, border bands, horizontal paneling, and horizontal draping to reduce the height and increase the width. Besides the related movement of colors in striping, paneling or draping there is the less obvious rhythm or related movement of color gradation. For example if orange is used as a color climax in the decoration in a string of beads, unless there is a deliberate purpose in making it the one contrasting note in an extremely restrained scheme, this orange might be repeated in duller tones in other accessory details like cuffs or border bands.

The color of the hat should as a rule not be a

single detached spot but should be brought into unity with the waist or dress through a repetition of exactly the same note or a related one. It is useful in this case to carry some of the coloring of the dress into the trimming of the hat. This type of less obvious rhythm or color movement through steps of increasing purity or value to a climax of the particular hue constitutes what might be called an increasing measure rhythm and corresponds in a way to the sense of motion in an ascending run in music.

Balance in Dress Colors. Symmetry in color is dictated by the structure of the body but informal balance in the placing of accents is subtle in effect and can help make an indifferent scheme or mar a good one. Top heaviness can result from a hat or collar which out-balances the rest in value, warmth or intensity; on the other hand, too strongly contrasting a border, hose or shoe may out-balance the upper mass.

It is always safer for the sake of color balance in a large contrasting area to have just a limited contrast of either value, hue or intensity. As the area grows smaller the degree of the contrast may increase and the contrast may involve two or more color principles simultaneously. To make this clearer the following propositions are given. A broad area of ornament or trimming permits only—(a) moderate contrast if in value only, hue and intensity the same as dress; (b) moderate contrast if in intensity only, value and

hue the same as dress; (c) a weaker contrast if in both value and hue; (d) a weaker contrast if in both value and intensity; (e) a weaker contrast if in both hue and intensity; (f) weakest contrast if in all three.

The Color Chord. It is not enough that colors be chosen which enhance the face by analogy or contrast. Within the dominant blue, green, or orange, there will have to be notes of decoration and trimming, border bands, jewelry, collars, sashes, over-draping, paneling. Even hosiery, shoes, purse, bag and parasol are all notes in the complete scheme. It might happen that in a given scheme all these would be of one hue, value and intensity. But if they are to be of varying hues, values or intensities, what are the principles to guide the dress designer in assembling these colors?

The fundamental one is that a dominant idea be present, a scheme which shall in the main be either contrasting or analogous with the coloring of the face. But within either of these arrangements, in selecting the colors with which the artist will create the ensemble, the aim should be very much like the aim of the pianist in composing chords; not a random group of five or six separately agreeable notes but a selected union of five or six notes which played together make sweet music, fusing and blending agreeably, and merging their differences in a unified ensemble. A number of typical schemes follow.

Possible Schemes. A one color scheme may be made very interesting even if all in one value and one intensity, through contrasts in texture.

A scheme of self-tones is the next in simplicity, involving least chance of error and yet permitting of considerable interest in the variety of values, intensities and textures. This may also have the interest of gradation or of striping, checking or vibrating weave.

A two color scheme with self-tones of the one color and a single contrasting color is the next in simplicity.

A two color scheme with self-tones of both colors; one kept dominant, the other subordinate is the next in order of contrasting effect.

A three color scheme with one dominant, in self-tones, a complementary and a third color analogous to the principal color or its complementary comes next.

A many-colored scheme with one dominant and one complementary, used with neighboring hues of dominant, neighboring hues of secondary, or of both comes last.

In addition among possible schemes are white, black, white and black, white and dark gray, black and light gray, grays, gray and one color, gray and two colors, gray and three or more colors, white and one color, black and one color.

Dominance in the Chord. A dress scheme should like any color scheme be conceived with some dominant idea. For example a black-

haired young woman might plan her dress as a harmony, dominantly orange with blue trimming. Analysis of one such scheme revealed the following: *

Dominant Color.		*Subordinate Color.*	
Orange in dress goods	$\frac{V^3}{I^3}$	Blue in collar	$\frac{V^3}{I^3}$
" " shoes	$\frac{V^6}{I^2}$ (tan)	" " cuffs	$\frac{V^3}{I^3}$
" " hat	$\frac{V^8}{I^1}$ **	" " beads	$\frac{V^5}{I^4}$
		" " hat-band	$\frac{V^3}{I^2}$
		" " hose	$\frac{V^4}{I^2}$

Second Subordinate Color

Gray in base-border V^5

" " hat-brim V^5

In the foregoing the dress goods, a dull gold of ribbed silk gave interesting gradations of yellow orange, red and even grayed blue glints in the play of light and shade. The collars and cuffs and hat-band were of a somewhat shrill blue, shiny of surface. As the features of the wearer were somewhat sharp this blue collar was not brought clear around the neck. Instead the soft roll of the dress goods itself created a less contrasting edge in front. This soft roll was more favorable to

* V = Value. I = Intensity.

** A dark grayed brown.

the features. A long string of blue beads made an interesting contrast across the dress and helped as an extra border line to frame the head, combining as it did with the blue of the collar and the hat-band to create around the face a radiating spotting of blues to contrast with the grayed orange of hat and dress. The gray fur in the trimming of the hat-brim, and the border at the base of the dress introduced a further contrast—the contrast of texture.

Textures in a Color Chord. The value of texture contrasts in making for interest in such a scheme as the foregoing can hardly be overestimated. The furry gray in the first place has a quality of soft depth about it which contrasts effectively with the lustre of the ribbed silk. Fur moreover is free from edginess and for that reason proved useful in the base border, where edginess would be a falsely insistent note. The heavy beads, a greenish blue of dull surface, made a good contrast with the broad smooth sheen of the blue collar and cuffs, and with the lustre of the dulled orange dress goods.

Men's Clothes. In the men's clothes of the last few decades, there was little thought given to such vanities as color rhythm, balance or proportion, Within the last few years a complete change has come over the industry. To-day rhythm of line in lapels, waist and hip; proportion in lapel cuffs, pockets and the length of coats, are increasingly in evidence, and textures, colors and patterns show

a much greater variety. There was a time when in the ready-made suit a few staple blues, browns, blacks and a larger variety of grays, cut in youths, mediums and stouts, comprised the range of selection. To-day not only do the colors show a greater range but the designer recognizes a larger variety of figures, each of which must have lines and proportions to match.

In the course of the remarks on dress, men will find points here and there which they may be able to apply within decided limits in their suits, and within less circumscribed limits in their shirts, ties and hats.

CHAPTER VI

COLOR IN THE HOME

Every Home a Confession of Taste. Every person can approach the task of home planning in the same spirit as the artist approaches his canvas. Whether the home looks like a slipshod work or like a masterpiece depends upon the taste of those who assemble it. If people felt that their taste and personality were as much under observation in their homes as in their dress they might grant to the home a larger measure of thought, and might insist on an educational curriculum which would enable them to approach its problems with increased knowledge. As it is, most young couples, upon marrying, go out and select the furnishings with which they will live for years, with very little basis for critical judgment.

The beautiful home bears the stamp of its occupants more unmistakably by far than dress. The habit of conformity, the lack of originality and of experiment and joy in home-planning, reveal themselves through too many of the homes of America, where one knows in advance in any given class of the community, the general scheme and even the accessories. In the very pictures on the walls of a great many of the homes there is the tendency

to select the very same subjects which neighbors have previously selected.

This is the more regrettable since a home furnishes the most ample opportunities for self-expression, and home-planning can therefore become a particularly interesting form of activity. Much of one's love of life and nature, one's observations of art and the outdoors, one's joy in comradeship and children can find expression in the furnishing and coloring of the home.

The Home as a Social Force. A beautiful home is moreover a social force in the community, a silent but effective influence pointing the way for others. In the writer's observation of a number of settlement houses, one of the most effective results was accomplished without a word. Their clean, pleasantly furnished, agreeably decorated rooms, played a large part in attracting the boys and girls to the settlement houses, and moreover influenced those youngsters when they grew up, and set out to build their own homes. Any woman can thus affect her immediate social environment by the thought she gives to her home, and this without a single word of propaganda. But over and above all, the home beautiful justifies the effort and outlay of love and thought which it requires, both as the habitation of those who are dear to us, and as a setting for our own most intimate hours and moods.

The Home and the Character of a Period. The home has always been an intimate expression of

the life of a people, as conformable to their character as a bird's nest is to its habits. But in these days of big cities, flat dwelling and wholesale manufacturing, the home is tending to become a standardized product, manufactured for the population of the country in lots of a hundred thousand. What we are gaining in comforts and sanitation we are losing in picturesqueness and personality. An age distinguished by the greatest material triumphs known to history, the most wonderful exploitation of nature, the emancipation of man and woman from aristocratic and autocratic domination, an age which has brought within the reach of almost all, the prints of Japan, the silks of China, the rugs of Persia, the pigment dyes of modern chemistry, has failed to develop a home which has any warmth or character of its own.

The Dutch burgher, the American colonial, the French aristocrat, the English country gentleman, each is reflected in the settings in which he lived. If democracy is to create a type of home warm, intimate and personal, a suitable setting for the men and women who enjoy suffrage and are free individuals in a free land, its citizens must learn to approach the home as artists. They must seek to keep it free from all that is tawdry, stereotyped, cheaply commercial, and coldly mechanical in modern life. There is much that is beautiful in the world in which we live that should and can be reflected in the home. Color can be made a valuable asset in making the home a more beautiful em-

bodiment of all that is best in the modern spirit.

Fads in Home Decoration. The "Ultra Modern" Home. Though there is to-day a decidedly marked color impulse in the field of interior decoration and though throughout the land men and women are taking a new interest in the possibilities of the home beautiful, this tendency like so many modern tendencies is given over to experts for guidance. The interior decorator who is truly an artist is well worth employing if one has the means. But a whole tribe of decorators has sprung up suddenly like mushrooms to meet the demand which the Post Impressionist, the Russian Ballet, the modern stage decorator and the art educators have helped to create. Among these there are undoubtedly some men and women of taste, knowledge and experience, but unfortunately there are also many untrained and unqualified ones who are attracted to decoration because it offers them a professional opening which they feel is dignified. This type of decorator thrives only because in the general ignorance of many ambitious home builders, any one who relieves them of the task of choosing is as welcome as is the linguist in the dinner party who orders confidently in the ornate à la carte establishment in which the bill of fare is printed in French.

The result of entrusting the home entirely to this type of interior decorator who merely follows a vogue which he does not quite understand often leads to the grossest incongruity between the peo-

ple in the home and their surroundings. A retiring modest little woman married to a common sense practical rising lawyer of substantial income is given an ultra modern theatrical stage setting, bright orange walls, the upholstery of the furniture in peacock blues and blue greens, with parrots in screaming yellow for ornaments. "What do you think of it?" the vague little woman asks her visitors with that half smile which betokens a doubt she has not the courage to express.

Subordination of Room to People. Just as the dress should be subordinate to the face so the color in a home should be subordinate to its occupants. The home should be a frame, a setting for the people who dwell in it. The frame should never outweigh the picture. Not only was the brilliant room just described incongruous as a background for the wife and husband, but it was also a very poor background for their guests. How many faces can hope to compete with the warm glow, the advancing colors and strong dazzling contrasts in such a room setting? Hospitality dictates that the guests be permitted to feel that they and their gowns are set off rather than destroyed by the room in which they are to meet one another.

The Search for Color Chords. The first and one of the most pleasant tasks of the home planner is that of observaton. The homes of friends, the exhibitions of home decoration at department stores and galleries, the paintings, textiles both

Oriental as well as Occidental, pottery by the great colorists, even the colors of fall leaves, of seashells, and of butterfly-wings, all become sources of inspiration for a color chord or a color arrangement. For here as in dress it is the color chord which should furnish the key to the whole scheme. The personality of the designer will reveal itself in the quality, the distinction and the fitness of that chord and in the disposition of its separate notes.

Here also as in dress the range of chords is quite large; grays alone, self-tones of one color, grays and one other color, black and one other color, grays and two other colors, black and two other colors, three or more colors with or without gray or blacks; these suggest the range of possibilities. In the chapters on contrasting and analogous schemes, many possible color chords are suggested and the main points there stated apply to room decoration as they do to all color designing.

Chapters II, III and IV should be read and reread before committing one's self to a scheme of decoration. The experiments with the colored slips which were suggested in those chapters will aid to a fuller realization of color as an active force. This chapter will not pretend to be exhaustive but, as in the rest of the book, will aim at suggestiveness and stimulation of interest rather than at finality of judgment. As it is the intention of the book to keep close to the needs of daily life,

its assumptions will be democratic and the apartment or small house of a person of fairly moderate means will be the home in mind although most of the color ideas discussed will apply equally to the still simpler as well as to the more sumptuous home.

Adaptation of Color Scheme to Use of Room. Every room has some function, which suggests given ideas and associations to the mind. Colors may suggest emotions or associations in harmony with the function of the room. The color in a library may suggest study and quiet, in a music room fantasy and the life of the imagination, in a dining-room good cheer and hospitality, in a boudoir dainty elegance, in a sleeping-room repose. Spick and span might well be the dominating note of the kitchen.

Is color capable of responding to these various ideas? We have seen that colors may be warm or cold, advancing or receding, but can they be so chosen as to suggest comfort, cleanliness, good cheer, elegance? Of course it will be understood that any suggestions which follow are merely personal suggestions, and that the true spirit in which to approach the problem is one of experiment, with the leading principles as the only restraints upon imagination.

Color in the Kitchen. Let us begin with the kitchen. Everything *is* spick and span. But that is not enough. The proud housewife would wish everything to *look* spick and span. Certain colors

and certain textures may be spotless and dustless, and yet the kitchen may miss that shiny brightness which is desired. Dark colors and rough textures, no matter how clean, may tend to hurt the effect. The colors must be light, they must be bright, they must be shiny or polished of surface. Oil cloths, linoleums, tiles, a metal-lustred stove, white or enamelled woodwork, a very light scrim curtain, a sprig of laurel or some other green upon the window sill, will help the general effect of bright shining cleanliness.

If by any chance the room is poorly lighted to begin with, the use of white enamelled, or white tiled areas becomes all the more important. In a given case a dark kitchenette positively repugnant in its depths of shadow was transformed by the use of some white enamelled sheet iron. The light which reached into that kitchenette was reflected and re-reflected from surface to surface until it seemed a positively bright and cheerful spot. The change meant an outlay of a few dollars, and would have cost still less if oil cloth had been used, but there was a satisfaction in the use of the kitchenette from that day on which was worth many times more than it cost.

With the many bright and shiny things a kitchen holds, there is room for a contrasting note of relative darkness to soften the effect. Spots of blue as exemplified in the famous blue and white china, afford an effective relief, on the one hand heightening the brilliance of the white yellow or silver,

on the other introducing a needed balance of dark and cool notes. Blue, green, shiny black or any pure, clean-looking color will serve for this contrast but must never occur in too large a solid area. Whatever the scheme may be, whether blue and white, black and cream, green and white, or green and cream, the scheme had best be kept simple and obvious; for if in addition to sparkle and shine the colors are many and varied, the effect will be disordered. Blue, green or black on the dark side are preferable to browns or ochres because a cool contrast is called for by the large areas of warm light tones.

A personal note, the sense of difference and novelty of effect which is at all times worth striving for may come also from the choice of an odd note in the third color, in the window hanging, or elsewhere in a large mass; yellow-orange with blue and white; yellow-green with black and cream, or some similar combination, ideas for which may be obtained from butterflies or flowers.

When one considers the part played by the pleasures of the table in the scheme of life, one can well understand the enthusiasm of the host in one of the old country inns in France who arranged his place so that his guests entered the dining-room by way of a kitchen all aglow and sparkling with its ruddy copper-kettles, clean enamelled walls, crisp sparkling china, and glistening silver. The manner in which he gloried in the color mood of his kitchen could well be emulated

by the home builder in the planning of every part of the home.

Color in the Dining-room. If following the methods of the experimental psychologist the word dining-room were submitted among other words to a hundred people for their associational reactions, it would be found in all likelihood that, although the exact method of expression differed, the association most nearly common to the hundred would be "good cheer." For though literature to-day has lost the habit of lengthy descriptions of the joys of the table and bounteous repasts, the minds of men still run to good food and pleasant drinks, and few topics are more generally discussed than the memories or anticipations of a feast. English epic poetry, in fact all of the northern epic verse, is almost as discursive and detailed in its accounts of hearty repasts as in its lists of the mortalities on the battle-field. The fight with its animosities, the banquet with its comradeship, these are two of the main phases of epic inspiration.

It would seem to follow that the designer called upon for a scheme of decorations for the dining-room has a worthy theme, one calling for inspiration and poetic treatment. To suggest hospitality and good cheer, plus a sense of comfort and warmth, would require a color scheme less vibrant and sparkling than the brilliant kitchen. Though it would seem that the spirit of the meals is best harmonized with sumptuous tones in the lower

values of dulled orange, brown and red, yet light colors not over intense may be harmonized with the spirit of cheer proper to a dining-room. To keep an analogous scheme of darker tones from becoming sombre, self-tones or complementary notes of greater intensity and high value may be added in the accessories. To keep a scheme of grays or cool colors from becoming chilly a contrast of warmth in the accessories is most important.

In the dining-room, whether of lighter or darker tones, it would be best to keep the note warm and stimulating though not too intense. The table and the diners grouped about it should, however, form the logical climax and center of the picture, and nothing on the walls or ceiling should be insistent in its claims upon the attention of the diners. The table is the last bulwark of conversation, that almost lost art; around it people still manage to grow quicker of mind and easier of speech than in the sitting-room with its phonograph, pianola, card tables and other conversation-destroying mechanisms. It is therefore only proper that the colors of the room should play second fiddle to the color setting of the table.

Color in the Library. In the library quiet and restfulness are to be suggested by the colors, as well as in the general plan and arrangement. In most private libraries the last thing considered seems to be light; an agreeable, mild but sufficient light. It is probably because these are used primarily in the long hours of the night, when read-

ing is done by the table lamp. If for the sake of restfulness the color scheme runs to the grayed or less intense tones, the books might well be used to create a rich mosaic of color around the walls. Against a simple paneled wall in subdued receding colors the effect of massed books will resemble a rich tapestry or rug. The books can be kept the richest note in the scheme by an extreme simplicity and absence of design spotting in walls, hangings, floor and table covers. An occasional bronze upon the top of the cases, or a vase with a spray of flowers will furnish contrasting notes of classic scholarly decoration or gayer natural decoration which will add interest.

Color in the Nursery. Children, like savages, love strong colors. The Puritanic character of our education tends to make people feel that the color sense of children should be refined away from that of savages to the grays and color anæmia of civilized life. But the child's love of colors will hurt neither its eyes nor its taste. Moreover if the love for color is to be conserved into adult years the child should be permitted to indulge its natural fondness for strong colors.

The parent should by all means feed the child's love of color. Colored balloons, bowls of glowing fruit, kites of varied hue, gleaming goldfish, will fascinate the youngster. Its nursery accordingly should also feed this craving for pure color; copper-red, orange, pure blue, blue green, yellow and rich purple, not in large masses which might irri-

tate and over-stimulate, but as almost always when pure colors are to be used, small areas of intense colors against larger areas of grayed dull hues. The very chairs and table, the rocking-horses and other toys might all be colored in the same spirit, being painted to harmonize with the floor and walls and hangings.

Color in the Sleeping-room. A millionaire art dealer whose fortune was accumulated as a purveyor of art objects to the wealthiest families of America is credited with the following tribute to the emotional value of color. Turning to one of his buyers he told him to go out and select for his bedroom the ugliest wall paper, with the most horrible colors the buyer could find. The buyer, quite amazed, laughed, but failed to see the point. "I'm not joking, I mean it," insisted the dealer. "But really, Mr. X., you would not have your own room in bad taste." "I told you my wishes," Mr. X. responded. "I want a paper so bad in color, that when I open my eyes, I shall have to get out of the room. I don't make money lying in bed."

But as most of us rather enjoy our sleep and like to retire and wake in a room which will look restful and clean at bedtime and cheerful and stimulating in the morning, our choice of color scheme should have a different basis. Light grays with a touch of warmth either in the gray, in the pattern or in the hangings, furnish such a combination of restful cleanliness and stimulating warmth.

Cool blue gray, with gold or shell pink, cool green gray with pale lavender and black, ivory with gold and green; these are a few suggestions. Much would of course depend upon the values, the intensity and the arrangement in every such suggested chord.

Color in the Music-room. This quite naturally furnishes one of the best opportunities for fantasy and exoticism of color. For though many may quite reasonably object to bizarre effects, no matter how interesting, when these are planned for the dining-room, kitchen or library, there can be no valid objection to a more fanciful color scheme for a music-room.

A few of the essential limiting conditions are worth remembering. A scheme for a music-room should not over-stimulate, and distract from the music. Some people would rather close their eyes than listen to music in a room too distracting in its interests. It might therefore be safer to incline towards a richly relieved simplicity than towards an absolutely bizarre variety.

A second consideration is the fact that a music-room is likely to be graced by women in formal dress. The conditions of a ballroom, or a reception-room are here present and the same solution should be sought. There should be a quality of color in the lighting and a quality of color in the background which will most beautifully enhance the flesh tones and gowns of the women, and the blacks of the men's apparel.

Flesh tones, evening gowns and black, lighted by a soft warm light, are quite effective against gray green velvet of a value above middle. Where the room is not small, dull ivory, gold hangings and black paneling make an interesting scheme. A bizarre effect could be achieved by the use of black for walls, gold with green and black for hangings. Reversing the colors of wall and hangings would make the foregoing less bizarre.

Most people would prefer the quieter schemes in which a colored gray of specially odd charm is used as the dominant color, and a spotting of yellows, oranges, pinks, violets or greens in the accessories would furnish the light pizzicatto to the broad background of the gray.

Adaptation to Material. Color in Furniture. When the subject of color in woodwork comes up all that most people think of are the different woods, each with its own characteristic stain and color. But three things quite different may be considered; variety in staining, upholstery and painting.

There are many stains possible besides the traditional conventional ones to which we are accustomed. In other words, without any sacrifice of its natural texture or quality, even mahogany might be finished silver gray, or oak a dull black or a soft green gray. Only the currency of given styles and time worn habits make manufacturers cling to the few accepted tones with practically no variety or desire to experiment. Some of the

more novel stains are being used, and many others would come in if only buyers brought pressure to bear on furniture makers. The experimentally inclined might try out a variety of the stains which are on the market, applying these to different woods.

The use of leather backs and seats in furniture affords an opportunity for square and oblong panels, blues, browns and greens, which in given cases may be the clue to a complete scheme. Cretonne coverings also offer the most varied possibilities of color choice. Very interesting effects can be achieved by people of moderate means, through the purchase of an old set of good design in the framework, which is then completely reupholstered to match the room scheme.

But one other way remains for color effects in furniture; the least expensive way, painting.

Economy and Harmony. Painting vs. Textures. People are frequently attracted by a given color scheme as shown in the window of a decorator. They memorize the color scheme and remark how well the colors go together, but closer observation might reveal that the especial charm of the combination cannot be reproduced without the use of the same textures. For what was noted as yellow in a blue and yellow scheme may have had a satin finish which kept its whole surface vibrating with bluish, violet and soft green tones, which created the pleasing binding note between the yellow paper and the dark velour hanging.

At every point in the home beautiful well related textures play a most important part in the appeal of the ensemble. The graining of wood, the veining and polish of marble, the depth of lacquer, the silvery tenacity of fine lace, the lustre of silk, the sparkle of silver, the glow of bronze, the gay high lights of porcelain, each has its own appeal.

But the more exquisite textures except in the case of flowers are generally quite expensive. What are persons of limited means eager for pleasing and rich color effects to do? Their walls can be beautifully papered inexpensively enough. In fact wall papers present the richest variety of colors and textures and can contribute a larger measure of distinction to a room for less outlay than any other detail in furnishing. But what is to be done about the furniture, the scarfs, the vases and the window-boxes? The answer is to be found in paint, sealing wax, dyes and stains.

Home builders of moderate means should learn to apply color themselves. Through the magic of a few quarts of paint and some turpentine, the swift brush once it has learnt its business can transform the poorest workbox, the cheapest furniture, the walls, the scarfs, the flower pots and window-boxes into so many attractively colored units in a completely harmonized whole. What a wealth of color possibilities is now opened, from sombre black to vivid green, from ivory gray to intense red, from bright yellow to dull blue or

green; the whole range of color is at the command of the brush and the most unaccustomed effects can be planned. Sealing wax can also be used to transform the simplest china and glassware into attractive vases.

Through paint applied stencil-fashion, inexpensive scarfs, centerpieces, curtains and portières can be more effectively brought into the scheme. The reason that stencil patterns in color are suggested for these accessories where the texture is not very interesting in quality, is one which has been previously stated in the discussion of textures, viz.: that the poorer the texture, the more need there is for the addition of interest through color contrasts.

Harmony in Texture. The texture of the various materials is an important element in the pleasure of an interior color scheme. This statement refers not only to the texture of the individual surfaces and furnishings considered separately, but also to the harmony which they may create in ensemble. Constant observation of textures will reveal that the contrast of textures may help or mar a scheme. An oriental rug of silken sheen and finish, or a lustrous hanging may deaden the walls, the furnishings and the ornament, very much as a lustrous color in a dress might deaden the hair and eyes and skin of the wearer. The just right contrast of rough and smooth, gloss and dullness, surface shimmer and depth may be very agreeable. It is also well to remember that

purer colors are more permissible in roughly textured weaves than in smoothly polished weaves, for the former are self-graying.

Color in Curtains. The uniformly heavy white lace curtain ordinarily adds little to the color chord of a room interior as compared with a filmy white curtain, touched with colors in the dominant note of the room, or a yellow-orange curtain, with a spotting of the color which is the dominant note of the room. Over-curtains control the light more easily than do shades. As the curtains are against the light and so become quite important in the color chord the color of curtain and overhanging is worth the most careful study, and considerable novelty of effect can be achieved through just this one element. But the decorator must not forget that his effect, no matter how well it looks as a daylight scheme, must in certain rooms not neglect the artificial night lighting.

Color in Portières. Because of the self-graying which results from the long folds in which portières fall, these hangings may be somewhat purer in hue and more contrasting in pattern than wall surfaces. In one type of treatment the hue of the portière is complementary to that of the wall while its pattern is analogous to it. In a second type the hue of the portière is related to the hue of the wall while the pattern is complementary to it.

Border Lines. In wall-paneling, in portières, curtains, floors and even in ceilings, the border

band even if only a line border is a very useful and engaging note. The border line is very valuable in finishing off oblong spaces, making them self-contained. Like paneling, it also creates a variety in space relations which makes for interest. That this border line may hurt rather than help if the proportions which it establishes between the inner and outer rectangles is poor the simplest experiment will prove. In any case, where the border line is used it may separate two colors, either two self-tones or two different hues, in this manner introducing still further interest through contrast. The border line usually should be darker than the colors which it separates.

Color and Pictures in the Home. It was after a lecture on "The Ultra-Moderns in Art" delivered in one of the large cities before a woman's club, that one of the committee eager to avail herself of the very latest in *Art-Style* and *Fashion* asked the author whether it was true that pictures were "out." What she referred to no doubt was the fashion which was then "coming in," of omitting pictures in the scheme of most of the rooms. High-priced wall coverings, silks, satins, velvets, rare papers, or wood effectively paneled were being used as sufficient in themselves.

The fact is that as long as people love pictures they can remain part of the home decoration, fashion or no fashion. If the tendency was and is against them, it is largely because they are all too frequently among the disturbing things in other-

wise fair homes. For one thing, as frequently as not, the paintings in many homes are all wrong in color and bought for reasons quite unrelated to decorative harmony. "So and so down at the Club is a jolly good fellow," the husband announces, "and I thought I'd surprise you with one of his Alaskan scenes"; whereupon the cold painting, blue and white and green, is hung in a room which cannot stand those notes. Assuming that the room is good up to that point, the appearance of that picture among the remaining color notes is as likely to be a discordant intrusion as the addition of a chance phrase composed by an outsider thrown into a melody. Then again it is quite possible that the frames of pictures are in themselves annoying color spots detaching from the scheme.

Picture Hanging a Problem in Color Proportion and Contrast. But assuming that the color of the picture, and both the design and color of the frame are harmonious, the next source of difficulty is the size and proportion of the picture. In many an old English home, the panel for the family portrait was as much a part of the room plan as was the mantel. The homes were family possessions and pictures made places for themselves, or places were made for pictures. But the modern decorator planning a house for Monsieur Nouveau Riche finds it easier and safer to deny pictures a place in the home than to have a long tussle with his patron in which he explains how hopelessly bad his patron's pictures are, and how

poorly they would fit into the paneled spaces.

It is not enough that a given spot of decoration, a picture for example, be harmonious in color; it must also be harmonious in space relations, or in proportion. The square, the long or broad oblong picture, must in general proportion and size fit the wall space upon which it is hung. If a picture is well chosen and of a size, proportion and color suitable to a given space, and if it groups in with a piece of furniture or mantel as a complete unit of space and color relations, it is quite desirable, fashion notwithstanding. If one's purse will allow, decorations painted directly for given panels set aside for the purpose as part of a complete scheme are of course the ideal in pictures.

The subject of pictures cannot be discussed without a word regarding the mats used in framing prints and reproductions. As a rule the mats may well be omitted as an unnecessary note. Where mats are used, colored silks mounted on the mat board are in many cases preferable to the gold mat both for the sake of the picture and the wall; but in any event either colored silk of right hue, colored papers or even gold are generally preferable to white, which tends to create a hole in the wall.

Color in the Accessories. Care in the Use of White. While on this subject of white in mats it is worth observing that white is not simply a neutral non-committal common factor which can safely be thrown into any color scheme. It is a

positive color quite as capable of hurting a color scheme as any other color. For one thing, even in the reduced light of interiors, it almost always detaches from its surroundings and "jumps." It is for this reason that white was referred to as likely to make a hole in the wall.

From this point of view it will be seen that white scarfs, and white centerpieces as well as white mats may incline to be too loud, too edgy, too all-important. If one entered a most carefully planned room, all the colors beautifully harmonized but rather low in key, a white mat on a picture, and a white scarf on a sideboard would, if the light at all favored them, be the first and for some little time almost the only notes in evidence. White indoors is a fairly aggressive color and though it adds to cheer through its suggestion of light, it is best not to throw it into the scheme on the theory that it is harmless.

Backgrounds and Decorations. Climaxes. Portières, rugs, curtains, wall papers, and any large area, horizontal or vertical, may well be left comparatively quiet and receding, the bright and intense colors, if there are any in the scheme, being reserved for the accessories. The small areas of appliqué, stencil, or other pattern may be bright against the duller quieter tones of the ground. The theory of proportion in color harmony is thus observed in that small intense areas balance large dull areas.

It is interesting to sum up the whole scheme

with its dominant and subordinate colors in some one climax in the accessories. The flowers on the dresser, reflected in the mirror, may sum up the scheme of the room in one accent of richer pattern and stronger hue. Two massive Chinese floor vases at either side of a window, may in their copper, blue and ivory tones act as the key to a dining-room scheme. A Post-Impressionist painting, in red, blue, black and yellow spots, hung in strongest light might be the clue to the scheme of a library, accenting the mosaic tones of the books and the general furnishings, or a quill pen upon the desk might furnish the note of climax in its intense yellow grading to orange.

Sometimes this accenting note is a contrasting note as when a blue painting with golden subordinate tones is the climax of a room decorated in dominant orange; or a black piano is made the climax of a gray and orange music room.

Adaptation to Structure. Active Colors and Size of Room. People are seldom conscious when they are disturbed by poor color choice, unless in addition to being poorly chosen the colors are also unusual. They will seldom be aware that the discomfort they experience in a given room is due in part at least to the color scheme. They grow nervous, restless, irritable, without realizing that the walls have been crowding and annoying them and that the room is filled with details in strong advancing colors which jump. It will be remembered that colors have among their properties,

activity. Some colors are active and advancing, others are weak and receding. Thus pure blue recedes as compared with pure orange, and gray blue recedes as compared with pure blue.

This property of color has a bearing on aerial perspective and the sense of space and distance. It would follow then that colors could be so employed in room decorating as to increase or decrease the apparent proportions of the room. Active colors advancing would tend to bring the walls and floor towards the eye. In a small room active colors would seem to cramp and crowd the occupants. Receding colors, suggesting space, would in their aloofness seem either to completely remove a sense of limiting walls and ceiling, or at least tend to keep them remote.

Intensity and Size of Room. In determining which colors shrink a room through their activity, the element of intensity in colors must be considered. For though blue and green are receding as compared with red or orange of the same value and intensity, an intense blue may become very active in a scheme of grays. Even blues and greens if pure can become too insistent and bring the walls up through the positiveness of their optic assault. Reducing the intensity, or in other words graying the colors, makes them less advancing and insistent in their retinal stimulation, and to that extent more likely to increase the apparent size of the room. Observe how the grayed tones suggest spaciousness in nature. In

the gray mists, the river and the fields seem broader, the ships and trees seem taller.

Texture and the Size of Rooms. The fundamental thing about the influence of color on the apparent size of rooms is the fact that the more eye-stimulating colors are, the more likely are they to reduce the size of the room. Advancing colors and intense colors are therefore not well designed for small rooms. From this same point of view, however, even gray colors receding as color might prove unfortunate if there was anything in their textures which made for considerable retinal excitement. Green is generally considered a restful color, but when shiny or glossy of surface it may become quite positive and advancing, even irritating. Textures which reflect little light will seem to yield and go back more than textures which are shiny or spotty. Just as out-doors the fields are broken in texture in the foreground, but become even and less marked in texture towards the middle ground and distance, so in a room distance can be conveyed by the self-effacement of the wall surface through its texture.

Color Pattern and the Size of Rooms. If the room is small, pattern on the walls or floors unless very small will tend further to reduce its size. A surface repeat or all-over pattern in strongly contrasting units of large size is fatal to a small room. Even small units upon the wall-paper or rugs will be equally bad if positively detached be-

cause contrast of tone will make the surface more insistent and advancing. For a small room then a flat color, rather gray, cool and somewhat mottled, is best. If a flowered paper is used, a unit in a self-tone or in a very closely related value of some other hue would create vibration of surface without detachment and without shrinking the room.

If the ceiling is low and it is desirable that it be made to appear higher, vertical paneling or striping should be used. In a small room it is best to have the color of panels or stripes analogous to that of the wall in hue, value or intensity. A striped pattern in a small room might well be a self-toned effect with very little contrast. Where the ceiling is high and the room is small good proportion may demand that the height appear to be reduced. In that case horizontal paneling may be employed, and in addition the color of the ceiling may be brought several feet down the wall. A large room which is to appear more intimate than spacious will permit the use of stronger intensities, more advancing colors and more positive contrasts, all of which may tend if well organized to bring it together.

Color in Floors. It has been stated under adaptation to structure that color contrast should be at the point of interest where the attention is to be focused. In the light of this principle it becomes apparent that the decoration of a floor in colors which claim and demand considerable at-

tention is a mistake in color accenting and emphasis. Certain types of Oriental rugs, even a large check pattern in black and white squares, no matter how momentarily effective are likely to prove too exciting and disproportionately interesting. Parquetry is deservedly in favor because of the agreeable self tones resulting from the play of light on a given wood texture set to catch the light at different angles. Rugs are best, as are even oils and linoleums when simple strong border lines, repeating the rhythmic rectangle of the rooms, strengthen their surface. A jumpy spotty pattern, or an involved medallion which holds the attention gives very much the same effect as would a red, yellow and blue striped shoe in a dress scheme.

Color in Walls. All Overs, Striping, Paneling. Walls should remain flat, and should keep in the background through colors which are relatively receding, but since a large area of the most pleasing color may become monotonous, there is the problem of introducing contrast into the coloring of walls. This may be achieved by an "all over" or "repeat," by paneling, checking, striping or mottling.

All over patterns in wall-paper have been considered. The danger of strong contrast between the pattern and the background color has been pointed out, viz.: restless eye movements are likely to be the result.

Striping introduces an agreeable even if obvi-

ous element of contrast which is best suited to walls when restrained in contrast. Checking, creating as it does diagonal as well as vertical and horizontal lines, is but little suited to walls.

Paneling is the method which in the very nature of the wall is best suited to introduce contrast and variety of color and of space relations with the least disturbance of the functional character of the wall as a simple structural element in the architecture of the room. Though paneling may seem a highly restricted and limited form of design expression if the reader will draw ten rectangles each to correspond to one wall of a given proportion of width to height, and then upon these rectangles, plan ten different schemes of paneling, the possibilities of variety in paneling will become evident. If the ceiling is low and it is desirable to make it seem higher the verticals are emphasized. If high and the ceiling is to be lowered in appearance, the horizontal lines are dominant.

Modifying the Box-like Character of the Room. An additional source of pleasure to the eye in the treatment of walls, one which may not seem to be, correctly speaking, a color effect is the breaking up of the flat wall surface by projecting volumes either the full height of the wall or reduced. Such projections if low and supporting plants, bronzes or vases add interesting variety to a room which would otherwise seem box-like. That the eye takes much pleasure from variations in the movement of the planes of the walls and

ceilings, is attested by the fascination of raftered ceilings, fireplaces, well designed mantels, a staircase or even a balcony. This variety in the relations of planes and volumes is also in part at least a color effect making as it does for self-tones and cast shadows.

Color in the Ceiling. An important item in a color scheme neglected by most apartment dwellers, even by those who have leanings towards art and decoration as applied to the home, is the ceiling. Of what use is it to plan a scheme of furnishings which would harmonize walls, hangings, rugs and furniture only to stop all thought of harmony at the picture moulding, the Dutch shelf, or some other arbitrary Mason and Dixon line above which white plaster covers the whole area. This dull dead white of the ceiling certainly cannot be assumed to be a constant in color harmony, always good, no matter what the color and furnishings of the rest of the room may be. That the ceiling is part of the room scheme should be more generally recognized.

A white ceiling is frequently offensive and harmful to the rest of the scheme. The only thing that may be urged for it is that it helps keep a room light, particularly at night, by reflecting gas or electric light. But this is only an excuse, not a justification. For in rooms where there is evidence in every color that light and reflected light have not been the general aim, this same white ceiling will be found.

The color of the ceiling may be chosen either on the theory of related harmony or of contrasting harmony. If the dominant note of the room is orange and brown, with blue subordinate, the ceiling may be either a pale grayed orange lighter in tone than the dominant orange of the room, or a light grayed blue to complement the warm tones of the room.

As colors tend to be advancing in proportion to their intensity or purity, it is wise to keep the ceiling colors somewhat grayed so that the ceiling is not brought down upon the heads of the occupants. If a ceiling is somewhat high and lacking in intimacy, the room can be brought to smaller scale by a somewhat purer hue. It will also be recalled that a gradation from low value rugs to middle value walls to high value ceiling makes an agreeable progression.

Color Composition in Interior Decoration. A very important feature in room furnishing in its bearing not only on the apparent size of the room but also on the essential harmony of its appearance is underlying unity in the character and arrangement of the patterns and colors which enter into the wall-papers, hangings, upholstery and the many other details of the room. All the colors might be agreeable as colors and might be fitting in relation to the use of the room and yet the effect might be poor if there were no well organized relation of colors binding all the elements of the room into a unity.

Rhythm in Hues. Related Movement of Weight in Colors. An aid to an ensemble effect is a gradual progression of color from heavier tones in the floor to lighter ones in the ceiling. This is a logical progression and it is pleasing. A room which has heavier colors in the upper section seems out of balance and top heavy. All our associations with nature have accustomed us to a sort of specific gravity in color, the heavy tones in the supporting colors below, and the airy atmospheric thinner colors above.

From this point of view it would be a mistake to plan a ceiling in black, intense red, strong dark green or any color heavier than that of the wall and floor. A ceiling so decorated, unless very high would seem to rest directly upon the heads of those in the room. Since an orderly progression makes for a sense of clarity and unity, it is a good plan to have a well thought out movement of values, hues and intensities from the floor through the walls to the ceiling. Horizontal paneling in the walls is an aid to the deliberate movement of these steps.

Rhythm in Hues. Chiaroscuro. The most agreeable color extended over a large area without variety or contrast becomes unpleasant, through its monotony. The lighting of a room introduces an unplanned chiaroscuro along the wall or ceiling as it recedes from the window.

This effect of a gradation from mellow light through half-tones to dark shadows can be deliber-

ately intensified for the sake of that mystery and glamour which chiaroscuro is capable of suggesting. The more concentrated the source of light, the more effective will be the play of light and dark. A diffuse light due to many windows makes sharp edges and even marked gradations more difficult to achieve. Just at present there is a passion for light and a love of silver clarity, due no doubt to modern ideas in sanitation as well as to the worship of the sun, the outdoors and fresh air. It is a wholesome reaction to the drawn shades and dismal interior gloom of a generation ago. But there is no point to a complete rejection of the principle of chiaroscuro.

The Mood of Chiaroscuro. The author recalls how wandering one night through old New York he came upon a little side street, just one block deep, at the far end of which a lamp cast the solitary light for the two rows of houses. There was a spell and mystery about the beautiful play of light and dark which radiated from that softly glowing lamp which it would be difficult to describe. Light flooded streets may seem safer, but from a color point of view this street was more eye-filling and romantic. In one of the hallways of that street a candle was burning. The same mood emanated from that flickering point of warm light, the softly illumined surfaces and the deep shadows of that hallway. For the eye at least the hallway had its fascination. So too in interiors, the sharp clear light which is so in vogue

may be desirable for many reasons, but there is a mood about chiaroscuro for which the adventurous decorator may well strive. Chiaroscuro can be secured through the concentration of the source of light, through the depth of the window frame and through curtaining.

Rhythm in the Contours of Color Masses. In a room, the colors of which had all been well selected as a color chord, the lack of unity would offend if the lines of the color planes in rugs, portières, wall-paper and the other elements had no well related rhythm. Rugs which are thrown about at random, pictures hung haphazardly at different levels, contrasting decorative units on walls, floors or other surfaces, all tend to keep the eye jumping nervously from one point to another.

Patterned wall-papers, cretonnes, embroidered hangings, the spotting of cushions on a couch or of ornaments on mantels or shelving are all so many things which the average home builder thinks of independently at the time of selection. The result of lack of organization in the line movement of this material is very much as though a number of musicians in a room were each playing a different melody written in different time. A simple related movement in the lines makes for poise and restfulness; a lack of clear, well-organized rhythms creates unrest and disorder.

Surface Patterns and Detached Spottiness. Wall-paper repeats, rugs, upholsteries and draperies which are flowered become more active

and eye-stimulating by virtue of their surface pattern. For pattern creates a contrast of values, intensities and hues between the ornament and the field or background. The stronger this contrast the more active becomes the surface. When the ornament is in marked detachment from the field, this insistence becomes the more irritating. But the colors or the spotting of the cretonne or wall-paper pattern may be such that a vibrating middle tone is created. A pattern black, gold and pure green might create a very spotty and jumpy wall. This could be remedied (a) by using the same pattern in self-tones of close values of gray green or gold, or (b) by changing the pattern, spotting gold and blue green over the black, black and gold over the green, green and black over the gold. A Kermanshah rug illustrates this treatment. Colors which "jump" or in other words detach from their setting make for restless eye movements and enforced retinal excitement. The most complicated spotting, flowered or geometrical, will, however, keep its place when it is very close in hue value and intensity to the ground or field.

Balance of Hues. A room interior which is all warm or all cold, all active or all passive, all low in value, or all high in value would annoy. A room which is warm would look flushed; if all cold it would seem chill; if all neutral it would fail to cheer or stimulate. A room which is all low in value would create gloom; if all high in value, it

would possibly be glaring. A balance of warm and cool notes should generally, but not necessarily, be in favor of warmth. If cool colors predominate and do not serve merely as a setting for rich warm tones, a certain formal chilliness may attach to the color mood of the room. Receding colors can be used for the large masses of background or settings; active advancing colors for the smaller areas of cushions, vases, flowers, ornaments on screens and other decorative areas.

Balance of Value. If the background is quite dark, the effect can be relieved by higher values in the accessories. If the background is quite light an interesting contrast can be obtained through dark notes in the furnishings. Where there is much contrast of value it is well to avoid too great a contrast of hue. Colors both fairly gray and of like or related hue may be in strong contrast of value without disturbing the eye quite as much as if there were simultaneously with this contrast of value, extreme contrast of intensity and hue.

If any one area is too light in value and is therefore likely to detach, it can in many cases be reduced in value through deliberate spotting or through cast shadows. Thus in a given case the author saw that a wall border was too light in value, and that it obtruded upon the eye. The color chord which had appeared harmonious in the hand proved weak when applied because the border looked too detached. It was decided to break

up the long horizontal band. But how? A Chinese lantern was hung from the ceiling at a point near the window so that it threw a shadow across the border band. Slightly beyond this shadow a picture was introduced. This was horizontal in shape, exactly the width of the band and with a color note complementary to that of the border. After another interval a second picture was introduced. Beyond this, upon a bookcase, a great mass of autumn leaves in a bowl furnished an interesting color note and with the shadow which it cast completed the problem of breaking up the long horizontal panel which had proved out of key.

Adaptation of Color to Light. The home builder who plans a room without taking into consideration the lighting of that room, in the morning, in the afternoon, and at night, is likely to come to grief when the color scheme has at last been applied. In any given case much of course depends upon personal feeling and the color mood at which the decorator is aiming. Thus a room exposed to the south may be carried out as a sun flooded room warm and gay, and the colors may be made light and joyous. For one who prefers a more subdued light and restraint in mood, the strong outdoor light would have to be balanced by dark and even cool colors. However, it would be safer to keep a southern room even when reduced in value and intensity, in those color tones which blend with the sunlight which will enter.

In a northern room, where the light is gray and

cool and the windows are few, it may be desirable to have a scheme in higher values and fuller intensities; or a virtue may be made of its subdued light in which case warmth and glowing purity of tones would be featured within the low values.

In rooms facing east or west, the light may vary from cool at one time to warm and sunny at another, but the change from daylight to artificial light which is still greater dictates that in all rooms the designer is forced to think of harmony under changing conditions of illumination.

In rooms facing east and west the solution involves a compromise between the schemes which meet the more positive conditions of the north and south exposure. A warm curtain filtering even the cooler light may help to keep the scheme intended for sunny exposure looking as well during the rest of the day.

Color and Artificial Light. There are occasional articles on the possibilities of reducing gas and electric bills through changing one's wall paper. But the suggestions which they contain are not so very helpful to one who prefers color harmony to gas economy. Granting that the use of certain colors will reflect more light or give the same light for less money, are all other considerations to be sacrificed to the passion for light as such? The fact is that the more light one has in a room poor in color, the worse the effect. A harmonious room will look agreeable in

soft reduced light; a discordant room is not improved by light as such.

Strong artificial light may have a decided effect upon the carefully planned scheme, modifying some one or more of the colors in such a way as to make the harmony of the day the discord of the night. Just as no modern shopper chooses her day dress by artificial light, or her evening gown by daylight, so no modern home builder should select the wall-paper and ceiling tones with regard only to daylight. The scheme should be finally decided upon only after the test of artificial lighting proves that the effect by daylight and the effect by night light will both be harmonious.

It would be almost impossible clearly to forecast every possible effect of artificial light as so much would depend upon the color of the light, e.g., whether more or less yellowish; on its intensity and on the textures of the colors receiving the light. But one general truth may be noted, namely that the yellow in a given color as the yellow in yellow-green tends to be lost in artificial light, so that the green in a room will seem more bluish, yellows and creams will be grayed, orange will grow reddish. When the yellow in the color of the room is essential to the harmony, and the scheme minus its yellow is poor in effect the choice of somewhat more positive yellow compounds in which the yellow will persist may save the scheme. In any event the color could be ac-

tually studied under artificial light so that a direct experimenting under the given conditions would enable the decorator to anticipate difficulties and correct them.

Though one way to correct the effect is the modification of the scheme in some of its hues, another which is sometimes not only satisfactory but even highly desirable is the use of colored lights. The lamp-shade or electric globe can be of such a hue as to throw into the scheme the correcting and blending color.

CHAPTER VII

COLOR IN BUSINESS

The Psychology of Appeal in Business. Business is based upon salesmanship. The possession of an idea is insufficient, the creation of a plant for commercializing it, which is in itself a triumph of salesmanship at the organizing end, is insufficient. There is yet the consumer to be reached, the consumer whose desire must be whetted. If the object in question is a new one, the consumer must be worked upon until he feels a need for it. If it is an old one there is need of arousing his interest in it through some point of appealing newness.

As color is, in spite of the subconscious nature of its appeal, a means of arousing and stimulating attention its importance can hardly be overestimated. This chapter will be devoted to some phases of color appeal in business.

The Artist and Color in Business. Just as the artist and the artisan in the Middle Ages rendered a large part of their most beautiful creative effort to the service of the church which was their patron, so to-day in ever-increasing measure art is becoming a handmaiden to that mighty institution of our own day, namely business. Each year sees thousands of young men and women trained to be

mystic priests of the cult of art for art's sake switched into "commercial art" for lack of any general social demand for their pictures. There are those who deplore this "commercializing" of art, who would keep beauty perched in solemn and aloof dignity upon a high pedestal of inutility. But if color and design are forces worth while, there is little to regret and much to be thankful for in the growing tendency to apply them to our environment, instead of limiting them to easel pictures built upon undigested art formulae.

There is of course a certain old-fashioned aristocratic tradition of the essential coarseness and vulgarity of commerce which makes the young painter's entrance into commercial art akin to the devil's fall from grace. But in this case an æsthetic devil so falling could transform hell and make it seem quite heavenly. If business has associations of coarseness and lack of idealism, there is no better way to overcome this than through the æsthetic appeal.

Business as a social phenomenon certainly accomplishes much more for humanity than did the aristocracy which created the habit of sneering at it. But a corrupt aristocracy which had the good sense to have poets, painters and sculptors embellish its lazy parasitism, is still looked back to fondly, while business organization which has been adding to human comfort and extending the boundaries of pleasure must submit to the constant slur of the idealistic art critics.

Many of the great artists of the Middle Ages and Renaissance came from the ranks of those who approached their work as simple craftsmen, wood-carvers of church benches, stone masons, jewelers, workers in gold and fresco painters. Their work evolved naturally from a craftsman's skill to an artist's self-expression. To-day the art student gets an education which relates to nothing at all. His drawing is "correct" but without reference to an aim. His coloring is "true" but without thought of organization. Even expression is not encouraged though it is tacitly assumed to be the end and aim of his studies.

On leaving the art school, the artist finds himself stranded. There is no relation between what he has learnt and anything in life. On the one hand, his drawing and painting are not means of self-expression, for he has never used them for any other purpose than to copy the set models. On the other hand, they are not means for decorative employment for he has not been taught design and organization. That any become painters whose results justify their struggles and privations is marvelous under the circumstances. But what is more unfortunate is that they are not even prepared to render æsthetic service in business, unless it be as "illustrators" for catalogues.

If more art schools gave art courses which related to the everyday needs of life, there would be no dearth of worth-while painters, but a great gain socially and individually in worth-while de-

signers in the fields of business service, interior decorating, colored illumination, stage setting and community play.

In this chapter and in some of the others on the practical applications of color, art students determined to enter upon a practical vocation may find suggestions for some social service which they can elevate to the status of dignified and highly esteemed professions.

The Business Man as a Color Artist. The common assumption about both color and design is that these being æsthetic lie primarily within women's horizons and that men need not concern themselves with anything quite so effeminate as art unless perchance they are artists. But a most elementary study of business will reveal that color knowledge is a business asset and that color is a force not to be under-estimated in a business career. Apart from the value of color appreciation as a source of enjoyment, the pleasure and profit to be derived from color expression in many phases of business life well justify a course in color harmony with special reference to business as part of the training of any youth destined for a commercial career.

The line of division between the artist and the layman is entirely too sharp cut. There is ample room and even need in business for color expression by the lay proprietor or manager. A business may be conducted on a scale too small for expert advice at every point, or taste may express

itself in the choice of such advisers. In any event, the business man who so wishes, may take the same pride in the taste revealed in his business as does a woman in the taste revealed in her home. He may look upon it as his canvas, one which his judgment will make attractive and harmonious from the slightest detail to the total impression. Something of the drabness of the small storekeeper's life would disappear if once he could take this artist's joy in the creative unit which he felt was taking on character through the thought and love he was expending on it. Certain details like the show window, calling for frequent rearrangement, would give him opportunity for a first-hand glimpse into the character of the artist's problems of color harmony, dominance, spacing, proportion, balance and fitness which would bring him closer to the heart of the function of line, mass and color than many of the present day art students ever reach in the long years of their schooling.

As interest in the æsthetic side of business service grows, the intelligent proprietor will make as close a study of color and design detail in his field of business as he does to-day in the more obvious factors of his work.

For those who either as artists or laymen are interested in the application of color to business, it is advisable here as in the case of color in dress to read the chapters on the principles of color combination and color arrangement, as those chapters have a most important bearing on many of the

problems of color in business. Certain special points however will be treated here under separate headings.

Color in Merchandise. In the manufacture of merchandise the question of color is sometimes dominantly important and obviously so, as in the case of ties, shirts, dresses, porcelain, trimmings, wall-papers and objects whose function is largely decorative. In many types of merchandise, the recognition of the importance of color is not quite so general. Strangely enough, there is considerable recognition of the value of color in appealing to the consumer and stimulating his desire in the case of candies, drinks, and the service of dishes.

Color in the Container. A useful device for creating a good impression and helping to fix one's firm or goods in the mind of the consumer is the color of the container; whether it is a bottle for liquid refreshment, a package for a cereal, a box for candy, or a large card-board box in which a suit or dress is delivered. Indeed even the paper and string used by the small dry-goods store may make a contribution. The color character of the container in each case is well worth the most careful choice.

Color in Business Offices. The business man in his office has until recently been given to a rather dry and almost deliberately cold type of furnishing. The roll-top desk, the colorless rug, professional charts, trade pictures, or enlarged photographs of departed partners or directors,

are fairly typical furnishings. As for a color scheme, the thought of it is far removed from the mind of the average business man. "Why man, I'm conducting a business not an art museum," would be his first reaction if the thing were suggested to him.

In the main of course he is right. A business office should look business-like and any elaborate scheme of rich decorative splendor would not be fitting. But on the other hand the assumption that to give the impression of business a man's inner office need be cheerless, unorganized in color and without thought for design is certainly to miss the value of the appeal of good color and its effect upon clients. In fact as things stand at present, a doctor, lawyer, dentist or a "commercial" man has few better means than art of impressing his place upon the memory of people who call. Quite naturally there should be nothing merely pretty about such an office. It should be simple and in harmony with its character as a place where men meet to discuss business, rather than to dance or quaff toasts.

Color in Show Rooms. Particularly important and worth while, other things being equal, is a distinctive color scheme and arrangement in the show rooms common to the clothing business. The conditions under which buyers see the sample lines which they are considering, going from firm to firm for hours and making notes of merchandise for comparison at the end of the day, make a show

room which will stand out in the man's memory through its color distinctiveness, very desirable.

Color in the Store. Here is a field which no shop or store-keeper can afford to neglect. From the humblest boot-black shop to the department store there is hardly a business which would not profit by the careful designing of its interior not only for maximum ease of service, but also for maximum appeal of surroundings. The cheerful, well-appointed, harmoniously colored store creates an agreeable impression which lingers.

In spite of the fact that people are seldom conscious of the influence of the color factor in their business relations, it is not only a matter of agreeableness, it is also a factor in prices. Even within the present limitations of store decorations, examples in point can be found in almost any one's experience. People will realize that they are paying more in one place than in another; they know this fact, but it is the attractiveness of the more expensive place which holds them.

The larger restaurants and the hotels, though they show an increasing realization of the value of color, still leave much to be desired. The smaller restaurants are however woefully ignorant in this matter. A day will come when it will be recognized as being quite as stupid to enter the venture of a restaurant without an attractive decorative scheme as without a good chef. Meanwhile, particularly in the smaller cities of the country, a dining-room which is not positively op-

pressive in its color tones and furnishings is a very rare thing even in the hotels. It may be claimed that the feeling of cleanliness is the most important and the only color sensation which a restaurant need suggest. But the feeling of immaculateness is in part a color problem; certain colors suggest cleanliness more than others.

But cleanliness by itself is not enough, for a clean place might still be cold and cheerless. In fact, a very carefully planned attempt at æsthetic effect if cold may be worse than good-natured coloring which has not been especially planned. The writer has in mind one department store in which there is every evidence that the designer planned for dignity, spaciousness and a distinguished effect. But the result is very formal, cold and unalluring. There is lacking that agreeable likeness within difference which the eye and mind demand. The effect of this on the sales of that store can hardly be doubted. Though it is in the heart of the department store center, many shoppers must be unconsciously influenced by the scheme to the extent of skipping this place in their round of the department stores. Even though it could not be proved that its austerity is repellent, it must be granted that agreeableness in color and plan would be a positive factor in helping to build and hold a clientele.

An æsthetically minded manager should be considered as much a matter of course in a department store as a general manager, an auditor or a

head buyer. He should be consulted in the general plan which is predetermined at the time of building, and thereafter in all the details from the selection of containers to the planning of window displays, fashion shows and special season decorations. Everything which appeals to the eye from the counter cards to the subway posters would come within his province and it would be his task to see that a certain distinctive tone should characterize every detail of the business.

In specialty shops which sell goods in fields where "style counts," it is of prime importance that not a detail which can make for the proper effect of superior elegance, exquisite taste, choiceness and "quality" should be overlooked. In such cases the business should not be undertaken unless in location, interior furnishings and decoration the proper setting for the goods can be provided. And every appeal whether by circular letter, news advertisement, poster, parcel-wrapper or display should have a note of personality and special attractiveness which will inspire confidence in the quality of the merchandise and service.

Window Display as an Art Impulse. One of the most fascinating problems in retailing is the decoration of the window. The impulse towards beautifying the window is present in a vague, half-baked, amorphous state in almost every storekeeper. The lettering of the firm name on the plate glass which the storekeeper looks at so lov-

ingly is of course a hired service. But the Chinese laundryman who hangs a little cretonne curtain across his window, the shoe repairer who ornaments it with a picture of Victor Emanuel and his children, the candy shop which displays a large ornamental candy form and enticing pastries, even the butcher who hangs up his quartered cuts satiny and silky and gleaming with a thousand high lights, all are attempting a picture in a frame, which he who runs may see.

It will not do to claim that the cretonne which the laundryman hangs up is purely utilitarian, that he wants to shut out the street, for the fact is that its top is lower than the eye of the passer-by. That his intention, no matter how vaguely or weakly realized or expressed, was pictorial is not disproved by the dirtiness of that hanging or its poor color. Neither a high degree of conscious intention, nor any degree of color or design judgment is present in these efforts; but the most primitive window decoration generally shows in addition to the mere display of store material, an impulse towards its decorative use.

If the assumptions of our news editorials, our popular magazines and our schooling were that beauty and the pleasure of the eye are things worth striving for, that ugliness perpetrated by a shopkeeper in his store window is tantamount to a physical assault on the eyes and should be resented as such, this democratic art impulse present even in the simplest of minds would grow.

Skill and taste would become essential to local success since residents would resent a poor window as a blot upon the neighborhood.

Although this book may not be read by that laundryman or that butcher, it would be possible through newspaper contests conducted for given localities in conjunction with a committee of artists with Board of Trade or other local prizes, to conduct window decorating contests which might in time have a permanent influence upon the whole appearance of a community.

For stores need not be a blight upon a residential district. In fact Fifth Avenue in New York well proves that stores if given a pictorial aspect can add to the interest and variety of a section. There are fruiterers, jewelers and others so picturesque in their window display that they would give a most valuable touch of color even to some highly restricted and aristocratic, but most monotonous residential streets.

The Economic Value of Window Display. A window may be looked upon as the salesman in the firm who speaks to people as they pass in the street, addressing them in the language of color. A storekeeper who is paying three hundred dollars a month for rental, and three hundred more for three salesmen, has in his window a fourth selling agent that costs only a small part of the rental and is capable of earning enough by itself to pay for rental and clerks. In fact in the smaller shops, the show window may be a determining

factor making the difference between failure and success.

When a man advertises, people from one to fifty miles away read about his wares. They must overcome their inertia and set out towards the store which distributes these advertised goods. There are reasons, and the best of reasons, in many businesses for long distance advertising; but what is strange is that firms which spend fortunes on newspaper copy, neglect to make an attractive and well planned color appeal to the prospective buyer passing just outside the shop.

Through the quality of its window display a shop can lift itself out of the medley of impressions which the pedestrian gathers as he walks, to a focal position in his attention. He may not buy anything in the shop at that moment, but an impression has been made. The effect is cumulative, for the passerby gets into the habit of watching for that window as he passes to see what new effect has been planned to greet his eye.

One department store in New York apparently realizing to the full the value of a distinctive and original window, uses a complete set of decorative paintings as backgrounds for its display. These are changed from time to time. But they are only the setting for a most carefully designed arrangement in each window, the effect of which is so attractive that the least observant people, who have hardly ever been conscious of

any possibilities of joy in color, look and say "Ah!" as children might.

Of course if a window is to be looked upon as a stage with proscenium and background, and with objects as the characters dramatically as well as pictorially arranged; or as a picture in three dimensions, then the principles of harmony, dominance, rhythm, balance and proportion, as well as considerations of fitness, are essential to worthwhile effect.

The Object of Window Dressing. Agreeable Ensemble. A display novelty of some freak mechanical kind may attract the passerby but it arouses no associations favorable to the business. The old-time small store keeper employed mechanical tickers, which caused the passerby to turn his head through their rat-a-tat on the window, but this nuisance is seldom met with nowadays. To arouse attention is not the sole object of window dressing. For attention disagreeably forced may irritate; attention aroused by unrelated novelties generally fails to create an agreeable association favorable to purchasing. What the decorator must plan for is an attention which once caught is held, and which while it is held tends to arouse an interest in the wares, or a favorable disposition towards the concern.

Thus a haberdashery must display its goods so that the wares take on maximum effectiveness through the stimulation of a craving for this shirt, that hat or the other tie, and so that the shop itself

is especially remembered for some warmth in the manner of the silent salesman window. The total impression then, no matter what the details, must be agreeable. Even the cheap bargain store with its piled-up goods in the windows, its hundreds of price tickets all showing the old price and the new defeats its own purpose. For the effect is confusion. The eye glancing at such a window is irritated by the hundred rival bids for its attention and quickly turns elsewhere for relief.

Of recent years, many druggists sin quite as badly as the cheapest perpetual "selling-out" shop against the principle of agreeable "ensemble," by presenting a bewildering chaos of conflicting detail. Dominance in impression and harmony in detail are then the aims of good window display. Color can be a great aid towards these aims and towards the agreeableness of impression, even where the display is necessarily over-rich in objects and tickets.

The Architectural Conditions. The first concern of the business man about his window must be for the architectural or structural conditions. Window frame, floor, top, sides, walls and back are important details in the effect.

The window frame as seen from the outside should if possible make a good proscenium, a handsome frame for the effects. These frames are generally painted in unattractive tones and then allowed to grow drab and soiled. A design

in contrasting colors, combining novelty, force and refinement would help to disengage a store from the medley of shops. The flooring should be good in quality, but should act as a quiet background. The character of the floor can be changed, by means of rugs or colored papers, to meet the requirements of new displays, and to harmonize in each case. Here also, novel effects are worth striving for. In one case a black flooring, covered with a heavy plate glass, reflected the objects above in deep and engaging tones.

The side walls, background and top need some finish which will make them enclose the picture agreeably. The most handsome display without a rear setting will look incomplete. The most beautiful arrangement in the lower window will annoy if it is not finished off at the top.

For floors parquetry has come into favor, as it combines quiet tones with vibration. For background one sees woodwork reaching up from three to five feet, screens, decorative paintings, latticed sliding panels with glass windows, the lattices arranged to create a pattern of curved and straight lines.

A set woodwork background, no matter how fine the quality of the wood, is generally a mistake from the point of view of color interest. Though department stores frequently use solid paneled woodwork as setting whether in floors or backgrounds, these can hardly be counted on to furnish the most effective background for a display

which varies from week to week. So large a note, unless it is neutral and quietly receding in color, should not be a constant. A grooved arrangement permitting changing sliding panels, covered with silk cretonne or wall paper would enable the decorator to vary his background in harmony with his display. This would be one way of meeting the difficulty. Screens with grooves for changing panels are also useful for the purpose but most ambitious is the method of the store mentioned which employed a painter to design very large decorative paintings from time to time. In the smaller specialty shops, the sliding paneled glass doors are effective when well designed, as the glass makes a quiet, soft, receding color.

Simultaneous Contrast in Window Display. But whether the shop be small or large, the background simple or expensive, the principle of choice theoretically would be that of simultaneous contrast. Bright silverware against deep dull tones; shirts of cool grays, blues and greens against a warm background; bright evening gowns of exotic colors against soft grays which would enhance their brilliance, all illustrate simultaneous contrast. If there are reasons why the harmony should be related and not contrasting; the effect could be still better achieved by slight differences in the intensity, hue and value of complementary colors. These would enhance one another's quality better than close values of related colors.

Overcrowding vs. Clarity. This is all assum-

ing that the window is not, as so many windows are, overcrowded with as much of the stock as the shopkeeper can get into it. One example will suffice. A drug store window shows a card "Hints for the Vacationist." The window is filled with a more or less symmetrical arrangement of tooth pastes, sponges, bathing caps, combs, brushes, rubber tubing, headache pills, perfumes and powders. In place of this a simple decorative panel made of cut outs from colored cardboards could have suggested the green sea, blue skies and colored sails, while in the foreground on a table an open suitcase, partly packed would reveal the accessories on sale. A small orange rug on the floor, the orange brown suit case, the spotting of the varied wares on a richly dark table cover, would make a complete picture, agreeably surprising, simple, suggestive and calculated to stir the imagination. One simple card could take the place of the many tickets of prices and reductions.

A little thought will reveal many other simple and equally effective means of silent salesmanship. In front of a blue hanging, a canvas tent might be placed. Outside of this the vacationist's needs could be agreeably grouped on a small dresser and chair. To demonstrate the possibilities of variety one more illustration will be given, this time of an abstract pattern. Against a soft blue gray background, bathing caps of brilliant hue could be distributed like so many gleaming yellow, orange and red suns. Streamers of bright

ribbons radiate from each cap downwards and forwards to low stands. These stands are grouped in a semicircle around a central stand somewhat higher than the rest. Each stand is covered with a colored cloth; these cloths are dark blue gray like the background. On these rest small groups of wares which belong together. As it is described here it may sound costly, but it is not costly, and in any event it is not the high cost which prevents such simple and harmonious windows from being the rule. It is lack of education and thought in color and design. The professional window decorator could certainly afford to carry a supply of properties, which he could use again and again in different combinations. And even the individual shop could afford a stock of varicolored hangings, screens and an assortment of wooden boxes, ranging in size from a shoe box to a case to use in planning such decorative effects.

Whatever the display material may be, the usual window trimmer's ideas are based upon mere novelty, good copy with telling points, or interesting form arrangements. These alone are insufficient. The subconscious appeal of a simple dominant agreeable color impression, with as much pleasant suggestion and stir as possible must be the aim.

Window Tickets. These should be so managed as not to bewilder by their spotting. In color and in placing they should harmonize with the general scheme. Their lettering should be as well considered as their placing. A druggist with a win-

dow display featuring his soda counter showed a table all set with summer drinks. By the use of most inexpensive colored crêpe paper he framed in this table as though revealed through portières, which were being drawn aside. But whatever agreeable impression this might have created was almost completely destroyed by large square pieces of paper pasted against the plate glass in two rows on either side of the window. These contained the names of the drinks and their prices. They were jarring and, being so large and close, the reading of any one was difficult because the eye was kept jumping by the rivalry of spotting. Tickets imitating in style an enlarged table card, listing all the drinks and prices, if placed on an easel at the lower right and the lower left after the manner of the cards announcing performers in the vaudeville houses, would have harmonized much better and would moreover have been read.

Specialty Shops. The proprietor of the specialty shop should make a most careful study of the color design in all shops in the same field looking for any hint which could possibly be of use. He should then go still further and with the aid of the most tasteful artist and color expert he can afford lay out his plan for the store interior and the window structure. Each type of business has its own special problems. The material itself is in most cases a large feature in the store decoration as in the case of the shoe boxes in a shoe store or the supplies in a drug shop.

In the case of a shoe shop the choice of woodwork and of the color of the shoe box should be the starting points in the scheme. An interesting paneling or subdivision of the shelved wall area so that the boxes and the cabinet work present an agreeable color and space relation will go a long way towards decorative effect. This type of color planning should be applied throughout all the details, to the accessory notes of plants or even painted panels. So also in the window, not only must the cardinal sins of overcrowding and rivalry be avoided, but the more positive virtues of color contrast, dramatic centering of interest, should be sought. The dealer can display the same number of shoes as appear in the overcrowded window, if he is the kind who feels the absolute need of showing the fullest variety to the passerby; but even in that case, there should be one central dominating point of interest made absolutely outstanding through its placing, on a different level high above the rest for example, and through its contrast with an especially devised colored background.

Color in Circulars. The circulars which go out by the millions to selected mailing lists throughout the country represent an enormous annual expenditure in which must be reckoned stock, printing, hand lettering, illustrations, copy and mailing costs, as well as the cost of the lists themselves. If the business man planning a circular campaign realized the extent to which its success depends

upon an appeal to the eye, he would leave no detail of that appeal unstudied.

When the letter appears in the morning's mail, the very first impression made by the envelope may be prejudicial and favor or mar its effectiveness. The envelope opened, the circular contained may be thrown into the waste-paper basket without receiving more than the one quick glimpse which reveals it to be a commonplace business solicitation. Something about the stock itself, its proportions, its addressing and its coloring should if possible enlist attention and create expectancy. The circular should follow this up by some agreeable novelty in stock, color and spacing if it is to receive consideration. It should not only be easy and interesting to read, it should be so agreeable to look at, that the eye will gladly linger over it. This at any rate is the ideal, the end to be striven for.

Stock in Circulars. The character of stock is important not only because of the difference in feel and optic appeal, but because of the suggestion of quality or lack of quality which stock may convey. The texture of stock is intimately related to color appeal, since five stocks all white or all "india tint" give different color impressions according as they are smooth and dull, smooth and glazed, rough pebbled, woven or satiny. The texture influences the color making it flat and hard, gently vibrating, cheaply shiny like cheap varnish over cheap wood, or rich in gloss. No absolute

rules can be laid down except that the texture should be as pleasant of surface as the budget permits, because all other things being equal texture as such plays a very large part in pleasing the eye. But the best of textures may be spoiled by poor printing and poor color. The cheapest of texture may be improved by good color.

Colored Stock. Where the texture is poor of necessity because the outlay must be kept low, it is generally advisable to use a colored stock, as an agreeably colored stock of poor texture will generally make a pleasanter impression than the same texture in white. Warm colors are usually preferable to cool colors, and colors of reduced intensity are as a rule preferable to pure colors. For the sake of legibility color should be of a value sufficiently high to act as a contrast to the print.

One Printing on Colored Stock. Where there is only one printing of a colored ink on a colored stock, the contrast of value alone as a dark brown on a "tan" or cream, or a dark blue on a pale blue, a dark green on a pale green is safer in the hands of most printers than a contrast of hues as well as values, as a dark blue on yellow, or dark brown on blue.

Two Printings on White Stock. Where there are two printings with white stock, black type and red used sparingly can be made very cheerful. A special printing for a pale yellow would be wasted money, owing to the indefiniteness of value contrast between yellow and white. Even orange will

not stand up in lettering on a white page as compared with red.

The Lay Out in Printing. The extent to which the layout of a circular poster or newspaper advertisement may through its contrasts of value make for interest is receiving increasing attention in modern advertising. Black and white represent the most extreme contrast in value. But black and white distributed over the whole surface of a newspaper in lower case type without margins or captions would create the effect of a pale vibrating pepper and salt gray. The same black enlarged and surrounded by white creates the effect of a greater contrast. In the first case the colors mix for the eye to produce a middle gray. In the second they set one another off, the black looking blacker, the white looking whiter. It is this fact which makes the large white borders and the "silent spaces" of a printed appeal so important. The "talking parts," or the black copy, are just so much more effective because of the white areas which set them off. Most people paying money for advertising are likely to feel that they must make the fullest use of their space, which is quite proper. But they defeat their own end when they interpret full use of space to mean a filled-up space. Crowded copy without contrast of spaces reduces the effectiveness and strength of the design as a whole.

It is not color per se which is an aid to interest through stimulating attention but color contrast

and color arrangement. In a good layout, there should be (a) a good margin of white, (b) good strong masses of black so large in area as compared with the white as to create an agreeable balance of dark and light, (c) such an arrangement of the blacks and whites as will create a rhythmic movement related to the shape of the circular and to one another, (d) such a relation in measurements of margin, top, sides and bottom as well as spaces between masses of copy, as to create a feeling of measured relation or proportion in the parts. Most difficult however in the fineness of the judgment required is proportion in the arrangement, since very much of the distinction of a circular poster or any other printed page may be largely in the agreeable contrast of measure in the space relations.

The Value of Line Movement in Interest. Where a printing is limited to black and white or one printing on colored stock and the designer wishes to enhance the attention-holding power of his circular, decorative lines and their movement can be of great service. To begin with, the simple border line is in itself very valuable in unifying the copy and framing it. Even on the binding of a book cover where the title and name of the publisher appear, it is desirable to have the finishing touches of a border line or two at the top and bottom to frame in the lettering.

But the conservative straight line border does not begin to express the possibilities of line move-

ment as a factor of color interest. The eye will follow the path of a moving line well set off against a contrasting note, particularly if that movement is repeated in many lines running parallel to it. This element of pronounced line movement can be introduced not only in free hand lettering but also in the illustrative or ornamental patterns on circular covers, posters or similar surfaces. In newspaper advertisements experimentation with heavy black lines for the novel effect of movement and emphasis which they can create is well worth study.

Margins. The margin as a color note may injure the effect of a circular booklet well designed in every other respect. In a given case a very elaborate and beautifully printed circular lost much in agreeableness through a quarter inch margin on a ten by twelve page. In characteristic enough fashion, every thought had been given to rich stock, the most expensive type, the choicest colors. No expense had been spared, and then one little error in the design gave a crowded, niggardly appearance to the page. It was not only that the balance of black and white was destroyed by the small margin, but the sense of amplitude and spaciousness which a less crowded page would have given was lost.

Applied Ornament. Trade marks, monograms and similar features of circulars and general advertising may if distinctive in design and color help to fix a name upon the memory. A truly dis-

tinctive color note in such an ornament is a great asset in arousing and holding attention. Here again it is not only the color itself but the exact spotting and proportion with reference to the page which must be carefully considered. Place the printed matter a quarter inch too low or a quarter inch too high, let it be a square inch more or less out of the way and color balance as well as color proportion are destroyed.

The Time Exposure. In the chapter on analogous and contrasting colors some aspects of color in business are considered. The important bearing of time exposure, and of associations of mood on the choice of color schemes is pointed out. A circular though it should possess the quality of "arrest" making an immediate challenge to attention, is also frequently intended to be kept handy for reference. The extreme contrast proper to the country side poster glimpsed from passing trains, is not appropriate to the leaflet or booklet meant to remain upon milady's desk. For such exposure the contrasts must be such as combine restraint, refinement and subtlety with novelty.

Color Mood in Posters. A circular so exposed must on that account be planned with every possible regard not only for interest and agreeableness in a general sense, but more specifically for definite associations with the goods advertised. It has been pointed out that in many cases the attempt to attain color mood may endanger that

contrast which is essential to interest. A poster for perfumery in a given case, may suggest subtlety of fragrance, but the delicate and subtle tints of the poster might fail to catch or hold attention. The solution may lie partly in the novelty of the colors, of their combination or in the novelty of movement in their lines and masses. A spotting of delicate colors on a black or dark gray ground will combine force and carrying power with the suggestion of fragrance.

Real Estate and Color. The owner of buildings has many color problems to face. In the first place the building itself in its façade, its entrance, its halls, elevator and stairways may look many times more inviting and be just so much more profitable through the tasteful application of color. There is no need for specific advice as to the exact color scheme for the exterior, or the interior halls. A study of the earlier chapters and the chapter on color mood will make clear the principal points of color contrast and variety, color mood and warmth of effect which are important. Plants and decorative accessories, such as curtains, rugs, painted upholstered or cretonne covered settees; the suggestion of hospitality warmth, sumptuousness; the careful avoidance of darkness, coldness or irritating hotness in color are points to be remembered.

In the planning of the apartments the builder should seek the maximum quality of distinction in textures of wood and in lighting fixtures, which

the budget permits. The proportion and placing of windows, doors, mantels, shelves and closets are most important considerations and are color problems, affecting as they do the proportion in space divisions. In a new building of fine textures in wood work, it might be wise to leave the woodwork unstained, offering the cooperation of the decorator to supply any stain desired to fit in with the general scheme planned by the prospective tenant. A feature like this makes a good talking point for an operator.

In large cities problems face the real estate owner which should be met by neighborhood associations of owners coöperating for given ends. One of these is the problem of neighborhood deterioration through the infiltration of cheap stores with cheap interiors and cheap window display. It takes only two or three such stores to cheapen a whole block; a few dozen can ruin a neighborhood from the point of view of the maintenance of a high quality of attractiveness as a residential section. This influences property values. The problem can be met coöperatively by a pledge on the part of each of the owners to insert a contract clause concerning the maintenance of decent window standards; or still better (since storekeepers might fear such a clause) by engaging out of a common fund an adviser on window standards to give certain elementary guidance to those shops which seemed in need of it.

Still another color problem which faces some

owners collectively is that of the handicap they are under in renting their stores because they are on the off side of the street. This could be met by a coöperative effort to offset the handicap by the poster treatment of the window frame, by service to the whole row of stores in the choice of more colorful and richly attractive signs, potted plants and even expert advice as to poster effects in window treatment. It is an experiment well worth trying and if successful would be very profitable in steadier and even higher rentals.

One further suggestion, the most radical of all is that in extending building operations into areas well covered with fine trees, it might be possible for some agreement as to a plan of lay out for the section, to be made in coöperation with the city, which would preserve something of the color and flavor of a country lane. This might be accomplished by abandoning the cut and dried arrangement of streets at right angles;—and pooling interests to evolve some small unit which will combine picturesqueness with practical thoroughfare, without sacrificing building ground. But this it must be granted is likely to sound quite visionary in the present paucity of coöperative effort.

The Morality of the Color Appeal in Business. Recently it has come to the author's notice that there are writers on economics as well as professors of "social science" who sneer at advertising as something essentially immoral and connected

with social waste. They point out that false demands, unwholesome cravings, the desire for foods, drinks and amusements which are unnecessary are stimulated by advertising. To such men, the suggestion that the appeal of color and design should be still more subtly and powerfully employed as an advertising adjunct must seem like a plea for the devil.

In the first place it may be pointed out that there is just as good ground for an indictment against the mind itself because of its frequent employment for unworthy ends. It may be true that advertising through the appeal of copy and of color can promote the craving for toasted sponge to the point where this becomes a national dish. But that fact, if it is a fact, would only prove the power of color and advertising rather than the inherent evil of either. In the second place, it should be remembered that the most desirable of modern innovations from new sanitary devices in the home to a new engine would be prohibitive in cost if it were not that advertising creates the large market which permits of cheap production. The symphony concert and the opera are made democratic institutions only through the advertising which brings an army to their support and therefore brings the prices within reach of every one in that army.

CHAPTER VIII

THE PHYSICS OF COLOR AND COLOR PRINCIPLES

The Source of Color. As the light of day fades, colors grow grayer and grayer. If every source of light disappeared from the world, colors would disappear too and the world would become black. For light is the source of color, and all the colors exist in the light which radiates from the sun or from any other luminous body. It is through the decomposition or breaking up of this light that the colors which reside in it are discovered. The rainbow with its beautiful colors is the result of the breaking up of the light which radiates from the sun, through the action of raindrops serving as crystals. The nature of this action will be better understood, however, if a single crystal glass, of the kind used as pendants on chandeliers, is held against a brilliantly lighted white sheet. The light in passing through the crystal will be broken up and a colored band similar to a rainbow will appear. This band of colors, is called a spectrum. The colors in the spectrum of the sun can be remembered by means of the word VIBGYOR, violet, indigo, blue, green, yellow, orange, red.

The Wave Theory. The Transmission of Color Through Space. The light which is the source of these colors travels from the sun through space in the form of waves. The trip from the sun to that crystal glass is made in about five hundred seconds at about the rate of one hundred and eighty-five thousand miles a second. Light-waves one sixty-one thousandth of an inch in length create the sensation of violet. Wave lengths one thirty-six thousandth of an inch give rise to the sensation of red. These wave lengths, corresponding in a manner to the distance from crest to crest in a wave of water, run into the hundreds of billions per second. The white light, which is the product of the waves radiating from the sun was broken up by the crystal into its component sets of waves.

Retinal Activity and Limitations. But there are waves longer than one thirty-six thousandth of an inch and waves shorter than one sixty-one thousandth of an inch. These, however, are not known to us as color, because the retina in its composition seems to be unable to respond to waves shorter than violet waves or longer than red waves. All wave lengths longer than thirty-six thousand to the inch, or shorter than sixty-one thousand to the inch are invisible. Our knowledge of the infra-red rays and ultra-violet rays has, therefore, come to us through other sources.

The limitation of retinal sensitivity to wave lengths determines the range of the rainbow and of our color perception. The rainbow would be

much wider and reveal more colors to the eye if it were not for this limitation.

Non-Luminous Bodies. Luminous bodies radiating light are the source of color. But it is non-luminous bodies reflecting light which are the principal concern of the student of color harmony. The rose, the dress, the table, the multi-colored poster, these do not generate light and so they are called non-luminous. If there were no luminous bodies in the world these non-luminous objects would be invisible. They become visible through the fact that they reflect more or less of the light which strikes them. It is now necessary to account for the different colors of non-luminous bodies, as, for example, the red of the rose and the green of its leaves.

The Redness of the Rose. The rose is visible only through the light which it reflects. In total darkness it would be invisible. In daylight, if it reflected all the light which it receives, it would be white. But the rose reflects only a part of the light and absorbs the rest. *We speak of the rose as red because it has no affinity for red and therefore throws off the red rays in the light which strikes it.* If there were no red in the light which illumines the rose it would seem black. To prove this, put salt in alcohol and set fire to the alcohol. The flame will be a yellow flame containing no red, and the rose illuminated by that flame will consequently appear black. The color of any non-luminous object, then, is due to that part of the light

which is reflected from it. If all the light were reflected it would be white.

The Retina and the Physiological Basis of Color. The eye is a camera equipped with an adjustable lens and a shutter. The iris which acts as the shutter is an adjustable diaphragm which can reduce the size of the pupil in sunlight or increase its size in the dark, thus controlling the amount of light received. Man-made cameras need considerable manipulation in focussing. But the lens of the eye is self-adjusting. It grows thicker for short focus and flattens out for longer ranges. The red rays of light from the rose pass through the cornea, the lens, and the humors of the eye, finally to impinge upon the retina which corresponds to the sensitive plate in the camera.

Retinal Nerve Endings—Rods for Light. Cones for Light and Color. The retina, physiologists inform us, is a surface presenting two kinds of nerve endings sensitive to the rays of light which enter the eye. These are called rods and cones. There are approximately seven million cones and thirty million rods. The rods, it is claimed, are sensitive to the light waves only as light and dark, without hue. The cones are sensitive to the various wave lengths both as light and as differentiated colors. When the red rays enter the eye, the rods are sensitive to them only as light, and without the action of the cones no color sensation would be experienced. But there are cones especially sensitive to red, which are stimu-

lated by the waves which the rose did not absorb. This stimulation is interpreted by the mind as red. In an eye deficient in active cones sensitized to red, the rose would not be seen as we see it.

Color-Blindness. In 1874 a fatal railway accident in Switzerland proved, on investigation, to be due to color-blindness on the part of one of the operators. The facts of color blindness had received attention since 1774 when Dalton, a Quaker chemist, innocent of any desire to shock or offend, attended a meeting of the Society of Friends in scarlet hose, which he in his retinal deficiency thought gray. But it was the railway accident which led to a more thorough investigation.

Total color-blindness would be due to a failure of the cones to register or differentiate colors as colors, although retaining the sensitiveness to light which they share with the rods. To a totally color-blind person then, the world is a place absolutely without hue, in which things are differentiated from one another only through their variations in degree of dark and light. Black and white photography may serve to give one an idea of the appearance of the world to the totally color-blind. The translation of hues into black and white values, which the pen and ink draughtsman accomplishes with deliberation, the color-blind eye automatically achieves just as does the photographic plate. Total color-blindness, however, is very rare.

Whatever the explanation of retinal sensitivity

to color, it appears that there must be either distinct nerve endings for given hues or distinct substances in the cones which are acted upon differently by the different chromatic rays. According to Dr. Ayres, in an interesting article on "Color-Blindness": "If one thousand men gaze at a garden of flowers, fifty of them will see the colors falsely. If one thousand women view them, nine hundred and ninety-six or seven will perceive the hues correctly." Of those fifty-three or fifty-four men and women, a few will be blind to red, a few will be blind to green, the remainder will be blind to both red and green. The statistics for color-blindness vary considerably in the writings of the experts on this subject.

Scientific means have been devised for testing color-blindness. Colored silks are used for this purpose. The subject is requested to assort these into classified piles, putting together all colors of the same hue. The errors made by the color-blind seem almost incredible to one who has never been told of the existence of this peculiar phenomenon.

The Mental Phase of Color. The Psychology of Color. The study of the origin of color in light, of the transmission of color waves, of their absorption and reflection by objects, belongs to physics. The study of the action of color waves upon the retina belongs to physiology. But there is a third very important phase of color study which has been receiving considerable attention in recent years. It is the study of the mental re-

action to color impressions. Color may be seen with the eyes closed and no light stimulating the retina; or the eye looking at one color may see another, or the eye looking at two colors side by side may get a different impression from each than if the same two colors were more widely separated. These are a few of the phenomena studied by the psychologist.

Subjective Color. Seeing "Stars." Visions. Color may be seen where there is no color. Let the reader press his fingers against his closed eyes, so that the pressure will be transmitted to the optic nerve. The darkness will be broken by a colored spotting, more or less kaleidoscopic in character. The expression "seeing stars" which describes the effect of a blow upon the eye, refers to the same type of subjective image. In fever, the blood pressure, exciting the visual center of the brain, in a somewhat similar manner causes distorted images and sometimes gives rise to powerful impressions of colored light. These latter the fevered brain may interpret as visions, angels, or special manifestations of providential interest.

After-Images and Successive Contrast. If one looks directly at the yellow sun for a moment and then closes the eyes, an intensely bluish spot will float about, will fade away, and then will reappear. It will grow lighter and then grow darker, but it will persist for some time. This after-image may be due to the over-irritation of the cones sensitive to yellow, resulting in their fatigue. This would

leave only the remaining cones sensitive. This experiment may be varied. If after looking at the sun one looks away at some other part of the sky, a pale blue sun will appear. As the last sentence was written the end of the author's pen and each letter as it flowed from its point were surrounded by a bluish halo, because he had just stepped out upon a balcony to renew the above-mentioned experiment. The blue sun which he saw against the sky persisted for a long enough time to be projected against the page upon which he was writing.

Retinal Exhaustion Through Intensity of Light. It would seem, then, that the retina is very quickly exhausted through exposure to powerful light. The area over-stimulated by the color of that light will then respond only to the remaining color waves. If the reader after looking for a time at a very bright red object held in the sun will then look into a mirror, he will see his own face apparently green, owing to the temporary exhaustion of the red sensitive cones, which fail to respond to the reds in his face.

Retinal Exhaustion Through Over-Exposure to One Color. Even in a reduced light the eye is subject to retinal exhaustion, particularly if exposed to a single color for some time. The eye looking at a red disc upon a white page will soon see a fringe of blue green around the edge of the red, or if it shifts to a blank space a circle of blue green will appear. This can be demonstrated with

one of the colored papers in the pocket of this book. The experiment can be repeated with a number of different colors. This phenomenon is known as successive contrast. A knowing salesman in displaying a series of reds, if eager to sell the reds for their brilliance, will offset this exhaustion by interposing grays or greens.

Simultaneous Contrast of Colors. The action of two juxtaposed colors upon one another through simultaneous contrast is, from the viewpoint of practical applications, one of the most important color phenomena. Experiment will demonstrate that a red looks more intensely red alongside of blue-green than alongside of yellow or orange. This cannot be explained on the basis of retinal exhaustion or of eye movements, for even at the very first glance the colors show up brighter when juxtaposed than when separated. A given gray will look darker against white than will the same gray against black. This may be due to illusion and mistaken mental judgment. Although the explanation of this phenomenon may well be left for the psychological experimenter to investigate, its practical applications are most important.

Color Harmony. Color has the power singly or in combinations either to irritate and exhaust the retina, or agreeably to stimulate the eye. Colors which, when combined, have the effect of pleasing the eye are said to be harmonious. While there is no absolute analogy between the two, color

tones may combine in optic chords as tones of sound combine in musical chords.

We have no basis for a mathematical theory of color chords, based upon a progressive scale of wave lengths and vibrations built upon a ratio, such as is known to music. Whatever physiological and physical basis there is for the study of color harmony rests rather upon the facts of retinal exhaustion, the need of balanced retinal stimulation, the phenomena of contrast, simultaneous and successive. To these in application however must be added the principles of rhythm, balance, proportion and fitness present in all the arts.

CHAPTER IX

THE THREEFOLD ASPECT OF COLOR

Hue, Value and Intensity. Knowing What to Look For. An artist who turns up a stone near a river's edge, no matter how well trained his eye, will miss a thousand details clear to the specialist in bugs and plant forms. The scientist walking through the woods will be blind to the almost endless variety of color tones which are clearly differentiated to the eye of the painter. In each case, if one is to see, one must learn what to look for.

For a worker who wishes to use color in planning color harmonies or to observe color with a nicer sensibility for its subtleties, it is an asset to become acquainted with the simple attributes and properties of color. Most people think of the sky as blue, of fields as green, of the rose as red, of a girl as a blonde or a brunette,—in each case as of so many absolutes. The great variety of blues in the sky, of reds in the rose, of flesh tones in the blonde or brunette are scarcely observed by the person who thinks of color unaware of its modifications. The variety of possible harmonies in dress, home, window display and posters will not be suspected by the person who wishes to know "whether blue goes well with red." Just as peo-

ple seldom think clearly when they have not the vocabulary of their subject, so people seldom see or plan color clearly, when they do not understand the threefold aspect of color.

The Color Cube. It will be a help to color observation if the reader thinks of color as in a sense three dimensional. Though the analogy is not perfect, yet if we think of redness as a cube, we can arrive at a simple conception of the threefold aspect of color. The redness which permeates the whole cube is its *hue.* But this cube lighted from above may be conceived as growing progressively darker from top to bottom. The gradations of light and dark in the red are called *values.* The cube may be very bright in the front plane but it may grow progressively duller and duller, less and less pure in its redness, towards the rear plane. This variation of purity is called *intensity.*

A given color is defined, then, by stating not only its hue or quality, but also its value or degree of light, and its intensity or degree of purity. In proportion as one learns to see colors in their three dimensions one can train color observation and memory. In proportion as one plans color schemes with thought for the notation of the hue, value and intensity of each of the colors employed one can learn to estimate color combinations.

The Color-Sensitive Painter and His Instructor. It is recorded about Chavannes, one of the greatest of modern mural painters, that while still an

art student he was engaged one afternoon in carefully painting the flesh tone of a model, influenced as that tone was by the exact quality and quantity of the light which shone in through the studio toplight upon her body. Couture, his instructor, entered and taking the brushes and palette from Chavannes quickly mixed his favorite formula, the few colors which gave him his standard flesh color. This he painted directly over the sensitive color tones in the study of Chavannes. That day Chavannes deserted the art school. Chavannes was sensitive to the varying character of color; Couture was not.

An Art Critic's Question: "What is Value?" An acquaintance, who occasionally writes essays in art criticism, approached the author one day at the Metropolitan Museum of Art with the question, "What is value?" As the theory of impressionism in figure painting and even in landscape painting is based almost entirely on an appreciation of value, this was an exceptionally good example of the lack of elementary color training even on the part of those who turn to fields where a knowledge of color may well be considered indispensable.

Hue Defined. A Synonym for Color. Hue is practically a synonym for color. Red is one hue, blue is another. Red and blue differ in hue, though a given red and a given blue may be equal in value and intensity. Hue refers to the quality of color and not to its quantity. Thus blue is blue

whether lighter or darker, purer or grayer. Its blueness is its hue, which remains unaltered no matter how its other attributes change. If its hue changed it would be changed in its fundamental quality and no longer be itself, blue. *Aubert, a physicist, figured out experimentally that the eye is sensitive to one thousand distinct hues in the spectrum.*

Value Defined. The Quantity of Light in Color. How may blue, while still remaining blue, change in value? Value is a quantitative word. It does not refer to the amount of blue in the blue color but to its luminosity, the amount of light reflected by it.

To make this clearer, imagine a blue ceiling in a room. The ceiling reflects a certain amount of light. Pull down one shade. Less light strikes the ceiling and, consequently, the ceiling reflects less light. *The blue has grown darker or lower in value.* If a second shade is pulled down, the blue grows still darker. Shut out almost all of the light, and the blue becomes almost black. Now, if a powerful artificial light is turned on, the blue becomes higher in value than it was at the beginning of our experiment. Receiving more light, it reflects more light. It would seem from this then that blue, quantitatively, may range from a blue which is almost white in the amount of light it reflects to a blue which is almost black. All the gradations from the highest pitch to the lowest would be so many different values of blue. *The*

value of a color may be defined as being a quantitative element in color, expressive of the amount of light which it reflects. In other words colors are higher or lower in value as they are lighter or darker.

Two colors may differ in hue and yet be the same in value. When each color reflects an equal amount of light to the eye their values are equal. Thus a red and a green may be equally light or equally dark, or in other words, their values may be equal. *Aubert estimated that the eye can differentiate at least one hundred variations in value for any hue.*

Intensity or Chroma. The Purity of a Color. The third attribute of a color is its closeness to spectral purity. Yellow as such is a hue because of its quality, its yellowness, which is due to the length of its waves. Waves of a different length would impress the retina as blue or red or blue-green. Of two yellows, however, one may be dark and the other light, because one receives much light and the other receives little. This difference in amount of light received would constitute a difference in value. But two yellows equally light or equally dark might yet differ in a third attribute. One might seem pure even though dark; the other dull and gray, even though light. The greens or blues of the distant hills grow grayer as the air grows misty and laden with gray vapors. The mist may make them lighter or higher in value, or it may leave their value un-

changed, but the intensity or purity of the blues and greens will be reduced by the mixture of foreign wave lengths, in other words, by the mixture of the color of the mist. In the same way the reader can gray colors by mixing them with their complementaries.

What seems very difficult for most people to grasp about intensity in colors is that it is a quality quite independent of value.

Colors can grow grayer or purer without growing lighter or darker. Thus a given pale tint of blue may be very shrill and intense in spite of its paleness or it may be quite gray with only a faint tinge of blue in it.[1] A blue goods may fade or grow grayer without growing lighter or darker.

Value in Grays. To understand value and purity in colors still better, let us begin simply by a study of value in grays. A value scale of grays running from white to black would enable us to appreciate the meaning of value, free, for the time being, from the element of hue and intensity. A white wall, a white handkerchief, a white rose is as dependent for its value upon the amount of light received as was the blue ceiling in the illustration given. With decreasing light that white wall will grow lower and lower in value until black is reached. Although it may pass in this way through a thousand shades of gray, we shall limit ourselves to ten steps between white and black. White represents the highest value, the maximum

[1] See colored slips.

of light. Black represents the lowest value, absolute absence of light. A pure black, however, exists only theoretically.

Gradation of Grays in a Rainy-Day Sky. The wonderful variety of grays, and the pleasure which is derived from their subtle gradation can best be realized on a wet gray day when the sky is overcast with clouds. Observe the clouds carefully, and though at first glance you see "just gray clouds" further study reveals the most subtle passages of gray, gently modulating into one another. And this great optic melody of subtly graded values, which the sky presents on such days, has some advantages over music in the possibilities of enjoyment which it affords. In violin music the gradation of vibration in the long sustained note which swells in volume, although it is the aural equivalent of color gradation, is a sensation in time. The optic melody of graduated grays which may with slight changes remain in the field of appreciation for hours, exists in space as well as time and can be observed and felt in any direction which the eye may choose to follow. In other words value in music is conceived in time; in color it resides in space and time. In each case the gradations of value may be the source of keen æsthetic pleasure.

Spectrum Value Scale. Varying Values of Pure Colors. When we observe the spectrum colors at their maximum intensity we find that they differ in value. The squares upon a black and

white checker-board receive an equal illumination. The white squares reflect all of the light they receive. The blacks theoretically throw back none of the light they receive, (actually they do throw off some light and therefore are not truly black). Just as those white and black squares exhibit an extreme contrast of value although receiving equal illumination, so spectrum yellows and blues have different values though equally lighted. Pure yellow as found in the spectrum is almost white in value. Pure blue is nearer black in value.

If the colors of the spectrum are placed alongside of the value scale of grays from white to black to locate the place of each in that scale, an interesting chart will be secured, one which will further explain the properties of color. Plate VIII presents such a scale of values for the spectrum colors.

Value Gradation in Any Given Color. Tints and Shades. We have seen a value scale of grays showing gradations from pure white to black. We now learn that yellow as found in the spectrum has a very high value. But our demonstration with the ceiling proved that a color as found in nature or in art may vary from a high light which is almost white to a dark blue, which is almost black. If the value of a color depends in part upon the amount of light reflected, then a lemon will show a variety of yellows from its high light to its shadow side, and a flat blue wall will grow darker and darker in its blues as it recedes from

the window, just as a blue metal pot will become so light in the sparkling highlights as to be almost pure white.

Tints, the Higher Values of a Color. The tints of any color are those values of it which approach white and which may be secured by the addition of white to its pure spectrum value.

In the case of yellow in the table on plate VIII tints are possible, although the arbitrary series of nine steps and the place of yellow do not permit of their being shown upon the chart.

Shades, the Lower Values of a Color. The shades of any color are those values of it which approach black and which may be secured by the addition of black to its pure spectrum value.

In the case of violet in the same table, shades are possible by the addition of small increments of black.

Value and Realization of Form. Form is to a large extent a color judgment verified by the other senses. In a child the sense of form and distance develops very slowly. Forms, their bulk, the separateness of their planes, their edges, their recession and distance are only slowly disentangled from the chaos of impressions. In this process the visual percepts are reënforced by tests and verifications brought through the other senses. We walk towards, we touch, we lift, and slowly learn, first the existence of volumes and distances; secondly how to gauge them.

The eye has been called the organ of anticipa-

tory touch. Through it we learn to judge in advance what sensations objects will call up whether of texture, edge, mass or distance. What keeps the world from remaining just a maze of color sensations to the eye? What is there about objects that enables the eye to distinguish between them, to judge that one object is spherical, another cylindrical, another prismatic?

Values in a Cube. Let us consider a yellow cube. Ignoring linear perspective we know without touching it that it is a cube, because of the manner in which the values vary upon each of the planes. What separates the object from its environment? Three values of yellow each with its characteristic area. Each of these planes separates from the other again through a clear cut difference in value. It is the shape of these three planes of the cube and the different values of each which reveal it to us as a solid of flat surfaces at right angles to each other. Only in a cube, a plinth, a prism, only in an object, in other words, of flat planes sharply defined one against the other will values break so suddenly along a straight edge.

Values in a Cone or Sphere. If we consider a colored cone, we shall observe how the values pass by subtlest gradations through tints to shades. In the sphere the transitions of tints and shades from left to right and from top to bottom are still more subtle. It would seem, then, that although an object is yellow, actually its value depends at each

part upon the amount of light reflected by that part. As the shapes of objects determine the angle of incidence and consequently of reflection at each part, light and shade furnish the clue to the shape of objects. Of course, the stereoscopic character of the binocular retinal impression which furnishes the mind with two separate and slightly different images helps to give the feeling of solidity.

Influence of Reflected Light and Color on Values. In all the foregoing study of light and shade in cubes, spheres and cylinders, the part played by reflection of colored areas back into the object was not considered. With this in mind the painting of a yellow orange on a glazed blue platter becomes quite a problem. The chiaroscuro of Rembrandt becomes useless as a technical resource to one who sees shadows as colored light filled with criss-crossing compounded hues resulting from a blend of the color of the object and the colors reflected into it.

Value, Intensity and the Sense of Distance. Values are a clue to the sense of space and distance. Centuries ago painters discovered that linear perspective, with its converging lines and its reduced scale of the objects farther removed, is only one means of suggesting distance. Another theory called ærial perspective recognizes the part played by value and intensity in the illusion of distance. Briefly stated, it is this: objects lighter than the atmosphere tend to grow darker

as they recede; objects darker than the atmosphere tend to grow lighter. Thus the bright yellow green of the foreground fields grows darker towards the middle distance. The dark tree trunks become lighter and lighter.

But distance also affects the purity of the colors. As a rule colors tend to become grayer as they go back. The atmosphere is more or less gray in color. This gray mixes with the colors of the forms in nature and dulls or reduces the intensity of the yellow green fields, the warm brown tree trunks, the reddish houses. As a result, these not only grow lighter or darker in value toward the middle ground and distance but they also grow grayer.

Value in Black and White Arts. In pencil drawing, charcoal, etching or engraving, when the aim is an imitation of atmospheric effects, the artist must translate color values into black and white values. Yellows, reds, blues, or greens are here all grays without hue. Only through their relative values can hue be hinted at. So the bright yellow fields are expressed by a very light gray, the deep blue hills by a dark gray. Similarly, in a drawing of a costumed figure, the colors of the head and clothes are translated into values of gray.

The Art Student and Value. The great need of a thorough understanding of value by the art student will be realized from this account of the experience of the author as a beginner in painting.

He had been drawing in charcoal for a year or two. It was decided that he might be permitted to join a morning painting class. Armed with everything he needed in the way of pigments and instruments, he made a charcoal sketch of the model upon his canvas. Then he loaded his palette with its fresh colors and picked up his brushes only to realize that he was completely at sea. He did not know where to begin. The instructor, an able painter but dedicated to the old theory of teaching, namely "practice and you will learn," showed him nothing, explained nothing, but said only, "Cover your canvas well and wash everything in before you begin."

Good advice, but what did it mean? The student did not quite discover the force of that advice for years. After painting the head, the collar and the coat, each separately and carefully, he started to paint the background. As this happened to be a large sheet of paper, an unframed outline drawing of the nude hanging upon the wall, he painted it white, but that made the head seem wrong. He wrestled with that background for hours, for days in fact, but he never could get the background and the face related.

Why? Because he was obsessed by the thought of local color and did not understand value. The white sheet in back of the head may have reflected so little white as it hung there on the wall that compared with the face it was very low in value.

Value in Painting. It was only after long practise that the student came to understand the meaning of his instructor's statement, that the whole thing must be painted in before one begins. If such a picture is to record what the student sees, it will from the point of view of color be a chord of three, four or five main values. The face will be one value, the collar another, the coat and the hair a third, the background a fourth. Whatever slight and subtle variations there might be within each of these can only be sought out after the values of the large masses have been recorded. The face, let us say, will be value 7, the background value 4, the coat and hair value 2, the collar value 8.

Velasquez, Vermeer, Whistler; Masters of Color Value. The position of Velasquez as "the painter's painter" is due to his remarkably keen feeling for value. He painted in color values sensitively felt, and so created the feeling of light and atmosphere falling upon and being reflected from the surfaces he was painting. Most others when compared with him frequently seem draughtsmen, filling in flat surfaces with conventional colors; creating pictures lacking in air. Whistler was very sensitive to color values and his criticism of the faults of the prevailing English portrait style was well founded. He pointed out the fact that the head in a good portrait, far from jumping out of the canvas, should seem just as far back of the frame as the sitter was in front of the painter.

For if the values are truly observed, the head will then go back and keep its place as it does in the room itself. There is no "flesh tone" as such. The face varies in value as it receives and reflects more light. Whistler, Vermeer, Velasquez were among those who keenly appreciated the subtle gradations of value to which color is subject.

Gradation in Art. "Chiaroscuro," Clear-Obscure. Not only does each color surface, such as a white wall, vary as a whole, it varies also through its area. Chiaroscuro, as the name implies, is the art of color gradation over a surface. Chiaro or clear, oscuro or dark, light-dark is the name of the style which Rembrandt and the Dutch masters raised to such perfection of technique that it enabled them to invest a sitting-room wall with mystery, a cabbage with grandeur, a head with a strange quality of elusiveness. Da Vinci's "Mona Lisa" is an excellent example of the subtlety of expression and mood which is made possible by the slow transition of a color from light to dark. The famous smile of this picture is elusive because it is painted with attention to the slight variations in the flesh tones as they pass from the dark corners of the lips into the lights of the dark cheek, then again through soft, ever-reduced values into the depths of tone in the shadows from which the eyes peer out. This is even truer of the art of Rembrandt. When Vermeer paints the gradation of value on the wall of a room, a wall illuminated by an open window,

the result is a loveliness of mood, obtainable in no other manner.

Color Symphonies Played by the Sun. If the painter has been inspired by the beauty of the infinite gradations of value in nature, how much pleasure is in store for the layman who trains himself to observe the subtleties of color gradation. Sitting in the author's studio one evening, a friend and he gazed through the open door across the garden at two slender tree trunks, silhouetted against the more distant stone wall. It was about six o'clock on an evening in late May. So absorbed and fascinated were they by the beauty of color which they saw in this modest view that they sat there for an hour, while from minute to minute with the fading light of day the values, the intensities, and to an extent even the hues of the wall, the trees, and the vegetation in the foreground changed. Color chords more subtle than the elusive harmonies of a Chopin recorded themselves there, only to melt gradually into other chords equally subtle, yet strangely different.

The color value of the elements in the scene were constantly changing, not only in themselves but in relation to one another. The trees, at first a red violet against the soft and darker golden brown of the wall, passed by degrees into an ashen gray violet while the wall became a brighter gold. Then the wall too became darker, and as its golden tone grew grayer, trees and wall seemed to merge, the trunks barely disengaged from the wall by an

almost imperceptible difference in value. Then the trunks became dark and acid-etched against the background of stone which, catching the last golden light of the setting sun, changed to a glowing orange. But description of this kind is entirely inadequate since, as has been indicated, words are too fixed in content to describe the endless variety of the color chords which were enjoyed that evening.

Color Mixing. It may not be amiss before discussing the formal side of the study of color properties to enter briefly into a statement concerning the mixing of colors. What is referred to is the mixture of pigments and not the mixture of colored lights known to the physicist. (See Plate I.)

The pigment primaries are colors *which cannot be obtained by mixture but which, in combining, will yield all other colors.* They are red, yellow and blue. The pigment secondaries, or colors mixed from the pigment primaries, are green, violet and orange. Green is obtained by mixing yellow and blue. Violet is obtained by mixing red and blue. Orange is obtained by mixing yellow and red.

Between any two spectrum colors lie the intermediate colors blue-violet, violet-blue; green-blue, blue-green; yellow-green, green-yellow; orange-yellow, yellow-orange; orange-red, red-orange; red-violet, violet-red. These can be obtained quite

simply by mixing; e. g., a small amount of orange plus red gives orange red. The same process is applied to all the intermediates.

How to Modify a Hue in Value. The values of any pigment can be raised or lowered by a number of methods. Higher values, or tints, can be obtained by adding white; lower values or shades can be obtained by adding black. Owing to pigment impurities the addition of black to lower a value too often affects purity as well as value, tending to muddy the color it is mixed with. Thus, though theoretically black added to yellow should give a shade of yellow actually it will give a grayed green or at any rate a muddy yellow. The value can also be influenced by adding a darker or a lighter color, but this also modifies the hue. A dark red added to yellow lowers its value, but it also modifies its hue towards orange.

How to Modify a Hue in Intensity by Color Mixing. If a given color, green for example, is to be modified in intensity it will have to be acted upon by another color which, though leaving it green, will make it seem less pure, no longer quite as green as it was before. It will require the mixture of another hue with the green to produce this effect. Adding a little blue to green will not give a grayed green; it will only create a different hue, blue-green, which may be equally intense (although it is in the very nature of pigment mixing that colors lose something of their intensity in the

process). Adding a little yellow to green will create yellow-green. The method to be employed for graying a color is to add its complementary to it. To gray a green, add violet. To gray a blue green, add red. Theoretically, it would be true that to gray a blue, yellow should be added, but we have seen that owing to the impurities in pigments blue and yellow mix as green. Therefore, to gray a blue in pigment mixture one must add orange.

Colors Which Gray One Another in Pigment Mixing.

Orange and Blue. Blue added in small quantities to the orange will give a grayed orange. Orange added in small quantities to the blue will give a grayed blue.

Green and Violet. Violet added in small quantities to green will give a grayed green. Green added in small quantities to violet will give a grayed violet.

Blue Green and Red. Red added in small quantities to blue green will give a grayed blue green. Blue green added in small quantities to the red will give a grayed red.

Browns. How, then, does one account for brown as a color? Brown has not appeared in the spectrum. It is not a primary, a secondary, nor an intermediate. But those who have mixed colors know that browns result from color mixture and can be obtained by quite a variety of methods. Although in theory a set of complementaries

mixed should give a progression in grays, in practice they frequently give browns. Red and black also give brown.

Thus, violet and green mixed should give grayed violet growing grayer and grayer as the proportion of green increases until the green and violet are equal in quantity, in which case a pure gray should be the result. Then as the green exceeds the violet, grayed greens should result, growing more and more intensely green as the proportion of violet decreases. Actually, however, unless the greatest care is taken in the mixing, browns will appear, violet browns and greenish browns. Similarly, blue green and red are likely to give, besides grayed reds and grayed blue greens, reddish browns, and bluish browns. Orange and blue will tend to produce orange browns, and bluish browns.

CHAPTER X

NOMENCLATURE AND COLOR STANDARDS

Lack of Color Standards. One of the difficulties facing the student of color is the matter of nomenclature and standards. Color and hue in general use mean the same thing, but in physics hue is only one of the attributes of color. Physicists themselves, though they agree that color has three constants, or measurable qualities, do not agree on the names of these. Hue, luminosity, purity; hue, value, chroma; hue saturation, brightness; are three typical sets. One physicist explains that saturation is the point where the purity and luminosity combined are fullest. For another, saturation is just purity or chroma.

In the field of linear and cubic measurement there are generally accepted standards. These standards are arbitrary, but an inch, foot or yard is a definite unit and can be used as a basis for measurement? But in color there is as yet no universally accepted standard red, yellow, blue, orange, violet or green. The spectrum colors cannot be the standards for daily use because colors as found in nature are not nearly as pure or intense as are colors found in the spectrum. In other words, a red as found in nature will have

orange or yellow or blue or green in it. Instead of being composed simply of waves of one length, it will be composed of mixed waves; of red wave lengths and waves of other lengths. A given red will reflect more or less light. How, then, is one to talk of color schemes, or of color complementaries, when the colors which are referred to call up no absolutely definite images?

Physicists demonstrate how color can be measured through various mechanical devices. But psychologists conducting experiments for color-blindness or color sensitiveness among primitive people, school children and adults, must still devote a great part of their written reports to explaining what they mean by red, green or blue, and what brand of colored papers or of colored silks they used in making their tests.

Aubert figured out experimentally that the eye is sensitive to one thousand distinct hues in the spectrum, and to at least one hundred values of each hue, giving one hundred thousand tints and shades. Then the eye senses about twenty variations in intensity, giving in all two million colors which the eye trained to judgment would be able to differentiate. Granting that any one of those two million colors is absolutely measurable, still in ordinary use the fluctuations of light would upset all the nice calculations. Indeed, even if exact measurement were possible, it would be futile.

For the conditions of everyday planning in color, which this book is aiming to stimulate,

mathematical niceties are impracticable because of their intricacy; moreover, they are unnecessary because, as we have just seen, there are so many variable conditions that at best one can hope only for approximations. In the rough, certain principles underlie color harmony, given colors combine better than others, but considerations of rhythm, balance and proportion must also be borne in mind, and the effects of successive and simultaneous contrast must be considered. These and considerations growing out of the practical needs in the solution of given problems are treated in this book with the aim of stimulating thought, observation, and experiment, rather than of creating what in the absence of a wealth of experimentation and research cannot be created, namely, an absolute psycho-mathematical science of color harmony.

As the ultimate test in the everyday use of color must be the pleasure of the eye and mind and not the mathematical totals as determined by Maxwell's discs, or by spectroscopic measurement, and as the exact values and chromas of the various hues in all the possible combinations could quite obviously not be stated, much of what is stated regarding color combination takes a form which is only approximately true.

Lovibond's Color Measurement. But there have been workers in the field of color who have sought to give to color-terms an exact, measurable and unmistakable connotation. In England a

brewer named Lovibond found that beer was at its best when it was a certain golden amber and that as the flavor deteriorated the beer assumed a reddish hue. In attempting to register that color as a standard for his brewing he found himself in difficulties. Any record he could make for constant reference faded or changed color. He inquired as to the progress made by physicists and was informed that they had nothing to offer in the way of a standard or set of standards which could be used like a color yardstick. He grew interested in the problem and the task became a life-work. The system which he finally evolved and which is used in many industries in England, besides having been officially adopted by some organizations here, is based upon the use of a set of colored glasses the exact hue value and chroma of which are mathematically determined through the use of a definite scale and set of units as starting-point.

Munsell's Color Notation. In our own country Munsell in his "Color Notation" has worked out a system of color statement which is very useful. His book aims not only towards scientific measurable notation based on definite standards, but also towards a simple optical measurement of color, based on familiarity with the principles of Munsell's color sphere.

By means of a sphere he essays to help color thinking so that the three constants of color can be seen in relation to one another. He aims also

to create a system of color notation whereby any color would have a definite place upon the sphere, the position of which could be mathematically stated and would serve completely to describe the color.

Around the sphere in ten divisions run blue, blue-green, green, yellow-green, yellow, yellow-red, red, red-purple, purple, blue-purple. Imagine an orange cut vertically through the center so that ten segments resulted. Each of these would correspond to one of the hues. Hues are to be found by a horizontal movement around the sphere; (Hue—horizontal, h).

From the upper to the lower end of a vertical axis are to be found the values. At any given level below white the same value will be discovered no matter what the hue. Imagine an orange cut horizontally in ten slices. These would represent progressive values from 0, at the bottom which is black, to 10, at the top which is white. So that at the equator any hue will have the value 5, (Value—vertical, v).

Chroma (or Intensity) in the Sphere. Chroma, intensity or purity registers from the periphery or surface of the sphere inwards towards its center. If a pin be stuck into the sphere horizontally at yellow value 3 but pointing to its vertical axis, it will remain within the given hue, and within the given value. It will, however, pass through a gradation of weaker intensities. If long enough to reach the center-vertical axis, its point will

no longer be in a grayed yellow zone, for the vertical axis is a value scale of pure grays. The chroma then, is zero, or gray, at the vertical axis and progresses by zones through 1 which is weak and very much grayed to 5 which is the chroma at the surface of the sphere, (Chroma—central, c). This "chroma" is what is referred to throughout this book as intensity.

Munsell's Notation System. If a color is to be described it can be stated in terms of its position on the sphere, e.g., yellow $\frac{3}{4}$, which would mean yellow value 3, which is quite dark, and chroma 4, which is quite pure. Hue—Value—Chroma h $\frac{c}{v}$. To identify a color, we see first what is its hue, its horizontal position in a sequence of colors; secondly, what is its value, or its vertical position between white and black; and thirdly, what is its chroma, or distance back from purity at the surface to gray at the center.

Munsell's Color Tree. But although the periphery represents colors at chroma 5, Munsell allows for the fact that some colors achieve a higher chroma than 5, which must be represented by branches at right angles to the vertical axis and extending to point 6, 7, 8, 9, or even 10. This is provided for in his color tree with its adaptation for such high chroma branches.

Value of Munsell's System. There can be no doubt that Munsell's system is valuable and has many points to recommend it for educational purposes, and that it is a concise and simple form for

visualizing colors in relation. But it is doubtful whether it fully solves the problem he set himself. To prove that the vocabulary of color description is very vague and does not correspond definitely to the visual imagery, he begins by quoting from one of Stevenson's letters written from Samoa to a friend in London. The letter follows:

"Perhaps in the same way it might amuse you to send us any pattern of wall paper that might strike you as cheap, pretty, and suitable for a room in a hot and extremely bright climate. It should be borne in mind that our climate can be extremely dark too. Our sitting-room is to be in varnished wood. The room I have particularly in mind is a sort of a bed and sitting-room, pretty large, lit on three sides, and the color in favor of the proprietor at present is a topazy yellow. But then what color to relieve it? For a little work-room of my own at the back I should rather like to see some patterns of unglossy—well I'll be hanged if I can describe this red— It's not Turkish and it's not Roman and it's not Indian, but it seems to partake of the two last and yet it can't be either of them because it ought to be able to go with Vermillion. Oh, what a tangled web we weave—anyway with what brains you have left, choose me and send me some—many—patterns of this shade."

Now when Stevenson was so stumped, the question arises. would the Munsell system have enabled him to describe exactly the color wanted, or

is it possible that there was something almost indefinable in his mental image? When he says "unglossy" he has, moreover, realized the important attribute of texture in his color image,—an attribute that most color-writers fail to appreciate though it is most intimately associated with color feeling. The very color Stevenson is thinking of might be shown him, only to be refused because a difference in texture might give him a sensation quite different from that which he is seeking. Thus, a gingham and a velvet both dyed with the very same red will each seem to have its own color mood. There are aspects of color too elusive to be caught in the color formula, blue ¾.

Although there is absolute need for standards in color, it seems futile to find fault with color because verbal attempts at its description, even in the hands of masters of language fail to correspond to the varieties of color imagery. For that matter, how would Stevenson describe to his friend in London the rustling of the Samoan trees, the wailing of Samoan winds, the surging sounds of Samoan seas. For ordering wall paper it is useful to have a specific color vocabulary, but the more sensitive we become to color, to its subtle and positive action and reaction to the surroundings, the more we must recognize that the eye, like the ear, can respond to more sensations than language is able to describe;

Though the two million perceivable variations of color to which the retina is sensitive according

to calculation, are not all quite so simply charted as Munsell might wish, it is for most purposes quite unimportant that they should be determined and stated with absolute accuracy. In using standards these need be as nearly exact as the circumstances call for. When we measure goods for a dress, the yardstick may be slightly warped, but roughly there is a given length which is approximately correct. When we require measurements for a machine part, one hundredth of an inch may make a difference. In ordinary color use, though the exact niceties of color may escape color notation of Munsell's kind, the painter, the designer, the decorator is certainly no worse off for at least being able to make a simple statement fairly descriptive in character. For this purpose the formula hue $\frac{\text{value}}{\text{chroma}}$ in terms of tenths is useful. As the author has chosen the word intensity for chroma this would be written hue $\frac{\text{value}}{\text{intensity}}$.

CHAPTER XI

COMPLEMENTARY COLORS

Retinal Exhaustion through Over-Stimulation. If the reader will place one of the experimental colored papers, a bright red for example, upon a blank white page and gaze steadily at this red near one of its edges for a minute or more, there will appear alongside of that edge a very pale but intense blue green. If he will then pull the red slip away there will appear directly beneath it a continuation of the pale blue green. This, as has already been explained, is due to retinal exhaustion. The nerve endings of the eye which respond to red have become tired and practically refuse to go on responding. The eye in looking at the white page, which is reflecting red, blue and green, fails to respond to the red and so senses only the remaining constituents of the light, thus seeing blue green where there is white. White light minus red equals blue plus green. Hence, the eye tired of red sees only blue plus green or blue-green.

Balance of Stimulation. Since long exposure to any one color thus tends to over-stimulation of a set of nerve endings, it becomes evident that no one color can remain agreeable, and that colors must

be correctly chosen in pairs to produce a balanced stimulation of the retina. What colors would best balance one another in the stimulation of the retina? The experiment described in the first paragraph proved that blue-green would balance red. Similarly, it will be found that blue and yellow balance, and that green and violet balance.

It will be observed that in each case of exposure to one color, i.e., to one constituent of light, as for example red, the eye tends to call up a blend of the remaining constituents of light, green and blue, as the complementary color. It would follow, then, that the complementary of any color would be the sum of the remaining two. Red plus blue plus green equal white light. The complementary of red is blue plus green, or blue-green. The complementary of blue is red plus green, or yellow. The complementary of green is red plus blue or violet. To find the complementary of any one of the experimental colored papers in this book, the reader can use the method of eye fatigue, placing it over white and observing the color which first appears at the fringe of the disc, and then beneath the paper when it is slowly withdrawn.

Complementary colors are two colors which, juxtaposed, will produce a balanced stimulation of the retinal nerve endings and if mixed, will sum up as white or grayed light.

Primaries and Secondaries. A primary color is a basic color, one which can not be derived through mixing two other colors. A secondary

color is a compound color, which results from the mixing of two primaries. Which then are the primaries and which the secondaries? This should be easy to answer. But there is a difficulty. Most of us, if we have been taught anything about color, have been taught that red, yellow and blue are the primaries, and that green, violet and orange are the secondaries.

The physicists, however, have more recently discovered that yellow is not a primary, that it is a mixture of red and green; and that green is not a secondary but a basic color, a primary.

"But," the painter will say, "no, that is impossible. I have obtained green by mixing yellow and blue, green is therefore a secondary. I have never mixed a yellow from two other colors. Therefore yellow must be a primary."

To which the physicist replies, "You have mixed pigments which, being gross, seem to confute physical theory. In physics the use of colored lights has demonstrated that red and green give yellows and that yellow is therefore a secondary."

The difficulties of nomenclature resulting from this difference between the mixing of pigments and the physical theory of color mixing are not insuperable. Grant to the painter his right to name the colors as they act for him in mixing, and to speak of his primaries as pigment primaries. Grant to the physicist his right to name them as he finds them in the composition of light and to call his primaries physical primaries.

Pigment Primaries: Red, Blue, Yellow.

Pigment Secondaries: Orange, Green, Violet.

Physical Primaries: Green, Blue, Red.

Physical Secondaries: Violet, Yellow, Blue-Green. (See Plate XVI.)

The Old Complementaries and the New. But it is wrong for the painter to ignore the sets of complementaries as experimentally obtained. It does not matter apart from pigment mixing which colors we call primary and which secondary; what counts in the matter of color harmony is the correctness of complementaries. Whether we call yellow a secondary and blue a primary as the new physicist does, or call yellow and blue both primaries as do the painters, the fact remains that they are complementary to one another.

The old physicist had as his complementaries:

Red and green,
Yellow and purple,
Blue and orange.

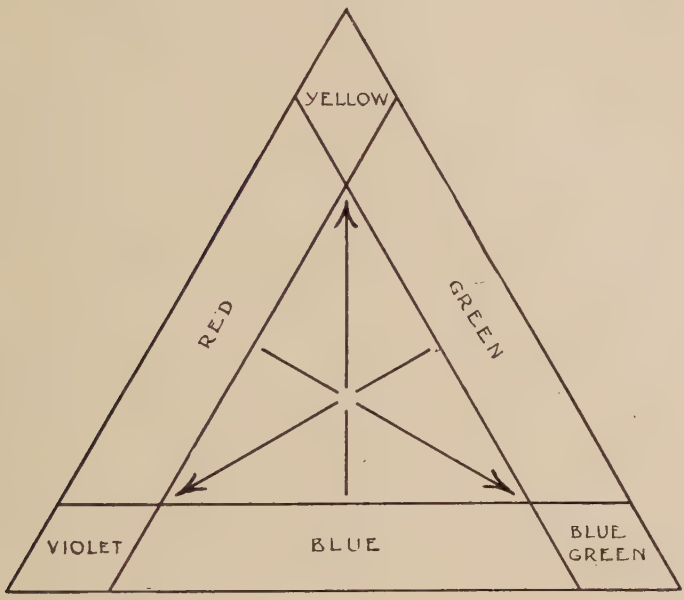
The new physicist finds the following as the true complementaries:

Red and blue green,
Blue and yellow,
Green and violet.

Complementary Colors and Color Attributes. If we study the complementary colors in pairs we will make some rather interesting discoveries with reference to their qualities and the variety of manners in which these complement and balance one another.

COMPLEMENTARISM

MIXING OF COLORS IN PHYSICS



Red, green, and blue are the physical primaries. Yellow violet, and blue-green are the physical secondaries. Red, green, and blue are the constituents of white light. Overstimulation by any one of these calls up the sum of the other two. Thus overstimulation by blue calls up yellow, which is the sum of red and green. Yellow and blue then are complementaries. The complementary of green is violet, or the sum of red and blue. The complementary of red is blue-green, or the sum of green and blue. Any two complementaries mixed give gray. All mixtures referred to in the preceding are the mixture of colored lights and not of pigments.

Colors seem to possess temperature; some seem warm, others cold. Colors seem to possess force; some seem active and advancing; others passive and receding. Colors seem to possess weight; some seem heavy, others seem light. In each of these attributes, complementary colors balance one another.

Warm and Cold Colors. Through association with the sun, fire and flame, red yellow and orange are called the warm colors. A study of the spectrum VIBGYOR reveals the warm colors as being all at one end of the scale. The cooler colors are at the other end. It will be noted that violet and blue are the colors of night and of shadows where light and heat do not penetrate.

That the principle of coldness and warmth of colors is recognized and is applied, consciously or unconsciously, in daily life, is proved by the use of pale greens and blues to suggest refreshing coolness in posters of summer drinks.

Study will reveal that the complementaries balance one another in warmth and coolness.

Yellow is warm; blue is cold.

Red is warm; blue green is cold.

A warm green (yellow-green) will be balanced by a cold violet (blue-violet).

A cold green (blue-green) will be balanced by a warm violet (red-violet).

Complementaries, balancing one another retinally, incidentally present in each pair a balance of warm and cold stimulation.

My Friend the Æsthete. Among my friends is one, a painter of cobwebby pictures of strange hues and stranger textures, a carver of wood who knows how to make his modeling appeal to the touch so that one wishes to stroke it. He is an æsthete to his finger tips, not only in line and form and color, but in his very contact with experience. His love of mystery, subtlety, and dimmed lights led him in evolving a scheme of decoration for his studio to choose black, silver, green and blue-green. But as he himself explains it, he found that the result always impressed him as a chord of music left unresolved; as a sentence the thought of which was unfinished. He found that people who visited him, though they were pleased by the novelty of his scheme, soon grew weary of it.

Then came the great discovery. All the while that chord of color had been waiting for its complement, lemon yellow. "Lemon yellow is a very wonderful color. It is like a person in an assemblage who mixes well; who is neither insistent nor aggressive, but is in spite of his restraint a positive force." All of which was his way of saying that he found that lemon yellow, which in its warmth balanced his cool scheme, brought to his room not only a note of warmth, but also a more positive note of force and light.

Activity in Colors, Advancing and Receding Hues. For colors which succeed in suggesting heat through certain associations and through their quantity of irradiation and reflection, also

succeed in suggesting greater and less power of self-activity. Thus certain colors seem timid and retiring; they are passive and seem to recede from the eye, suggesting distance. Other colors are bold and forceful; they are active and seem to advance towards the eye, suggesting nearness. When the baby reaches for the flame, the sun, or the orange, it is because of the intense activity of these colors which disengage themselves from the general blue-gray of their surroundings to come forward to impinge more strikingly on the child's retinal consciousness. At night all cats are gray, all colors seem to lose their aggressiveness and to become vague and elusive. The atmosphere as it recedes grows bluish in the distant mountain and the domed sky.

Nature seems to have reckoned upon the activity of certain colors and to have been very sparing in her use of them; rarely employing them as cloaks for large areas. The fields are green or dark brown, the sky and sea are blue or blue-green. Red is most sparingly used as are also yellow and orange which we associate with flowers and fruit, butterfly wings and narrow strips of sandy beach. Where nature gives us red, yellow, and orange more lavishly, as in the autumn trees, it is so broken up by dark shadows that the result, even in the richest autumn mass, is a broken color area in which cool shadows balance the activity of the strong color spotting.

Blondes and Brunettes, Vitality in Complexion.

Blondes, golden-haired and peach-bloomed, are alluring and captivating by virtue of the activity of their coloring. Brunettes, black haired and olive skinned, when they are not rosy of cheek are seductive and "mysterious" by virtue of the suggestion of distance and elusiveness in their coloring. The blonde of the Lillian Russell type is especially suited to the stage because of the force of her coloring. It "gets over." Brunettes upon the stage must generally resort to rich and active colors in their costumes for their carrying power. Blondes may appear in dark colors of receding hue as they may trust the brilliance of their hair and face to carry.

Advance and recession seem to suggest sound to some people. Red, yellow, and orange are frequently called loud colors; blue green and violet, quiet colors.

If we examine the complementaries we find that, when considered in pairs, they represent a balance of activity.

Yellow is advancing, blue receding.

Red is advancing, blue-green receding.

Green is moderately advancing, violet is receding.

Activity of Colors, and "Plasticity." Science and art, generally conceived as arch enemies, as far apart as the poles, each the result of an entirely different "faculty" of man's nature, prove in the case of color application to be mutually helpful. Since the Renaissance the researches of the

scientist have been eagerly employed by the artist. The mathematicians and the anatomists in the court of Lorenzo the Magnificent rubbed elbows with painters and sculptors. If the painters and sculptors were inspired on the one hand by the beauty of old Greek and Roman poetry, and found many of their themes in pagan mythology, they seem to have been equally impressed by the perspective charts and the anatomical dissections of their scientific friends. Compare the art of the fifteenth century with that of the fourteenth in Italy, and one feels at every point the preoccupation of the artist with the new scientific data.

The plastic painting about which one hears so much to-day is an amplification of the scientist's discovery of advancing and receding colors. If yellow comes forward and blue recedes, the movement of planes, the strong sense of modeling, and the feeling of the third dimension depth, can be strongly suggested by the use of yellows in the nearer planes and of blues in the farther ones. In a still life, a portrait, or a landscape by Cézanne in his later style the application of this principle to painting becomes apparent. It was, in part, this abler realization of volume in painting which led to the term "Cubist."

Color and Weight. Light and Heavy Colors. Observe children flying kites, and study the colors of the kites as they hang in the air. The kites float there suspended like birds, or with a flurry of wind they cavort playfully in wild circles. There

are kites of all colors. But the dark green kite seems somehow not to look right. It belongs to the earth. For dark green is a heavy color. It suggests weight, ponderousness. Look at the pale yellow one, or the pale pink one. They are in their place as they float or wheel in soft curves, for their colors suggest lightness and ærial grace. A lighter green would be more suggestive than a dark green of the power to rise above the earth on winged winds. Although value and intensity play a large part in the apparent weight of colors, roughly speaking the spectrum hues as such seem to complement one another in weight. Pure reds, yellows and oranges seem lighter in weight than pure blues, violets or greens.

One experimenter, E. Bullough, writing in the *British Journal of Psychology,* describes elaborate tests which he made to determine whether there is anything like a general agreement among a large number of people as to the lightness and weight of certain colors in combination. He points out that on a wall ten feet high, five feet of pink will not support five feet of red. The red would be too heavy. Five feet of red would support five feet of pink. Eight feet of pink would support two of red. Although this may be due to association, the mind being accustomed in nature to seeing the darks at the bottom, he is inclined to interpret it as a complication of color sensation with the idea of physical weight or solidity, "i.e., it might be an application of the mechanical law of gravity to the

attribution of weight to color." Further on, he adds that apparent heaviness is to be explained not as a landscape association, but on the feeling that "there is more of it." A glass of pale claret alongside of dark claret will seem lighter in weight. So red seems heavier than pink because there is more pigment in it. Colors approaching white seem light, colors approaching black seem heavy. The experiments with colored slips have demonstrated that colors approaching purity will seem heavier than colors of the same value grayer.

Complementaries in Color Harmony. From all the foregoing study of the character of complementaries and the manner in which they supplement and balance one another in their properties, it becomes evident that a study of color combination will necessarily be based in large measure on the use of complementaries. For complementaries make not only for a balanced retinal stimulation, but for an interesting variety and contrast of attributes.

CHAPTER XII

SIMULTANEOUS CONTRAST

The Interaction of Colors. To appreciate the influence of a given color upon the colors adjoining it, place a small strip of gray paper upon an intensely red ground. The gray will appear bluish green. This effect can be heightened by looking at the gray and red papers through a thin sheet of tissue paper, which is very valuable for experiments in simultaneous contrast. If the gray is now placed upon a blue green ground, it will appear reddish; upon a yellow ground it will seem bluish; and upon a bluish ground it will appear yellowish. In every case it would take on something of the hue complementary to the pure colored background.

If red tends to throw blue green into the gray, and blue green tends to throw red into the gray, it becomes evident and can be proved by experiment that placing a red upon blue green will intensify both the red and the green by contrast.

Psychologists and physiologists differ as to the exact cause of this phenomenon. But whether it is due to errors in mental judgment, to eye move-

ments, or to over-stimulation of nerve endings, *simultaneous contrast describes the mutual effect of two colors juxtaposed or placed upon each other.*

Color not an Absolute. That a given color is not an absolute, that it is a thing varying in many ways dependent upon the light it receives and the colors which surround it is a fact which must never be lost sight of in the study of color. For color, far from being chameleon-like, has quite often the opposite quality of increasing its difference from its environment, through contact with it. When a blue dress enters a golden room it does not become golden; it becomes bluer. Nor does the gold become less pronounced; on the contrary, it becomes more markedly yellowish.

Italian skies are certainly bluer than the skies of London or of Paris. But there are days when the vaulted dome above the sky-scrapers of New York might appear as blue as the sky above Venice or Naples, if there were the powerful yellows and pinks in our buildings to set off its azure by contrast. To see a white wall bright in sunlight against a New York October blue is an aid to a fuller realization of the importance of contrast in achieving interesting color effects. The blue medallions or borders in the golden-yellow Oriental rugs, the red roses on the blue-green bushes are examples of the application of this principle in nature and in art.

Simultaneous Contrast and Dress. A sitter and

her friend came to the studio of the author. The sitter was American, gray-eyed, golden-haired and fair. The subject of dress came up. Both confessed that they were in endless difficulties because of colors which did not turn out right. The friend complained of dresses which had made her look sick. She was a particularly beautiful Italian girl of the noble Roman matron type, of olive complexion, with fine modeling of features and very dark eyes. Each, equally attractive in her way, found that a dress could, through a mistake in choice of color, be quite hostile to her good appearance. However, it is unnecessary to amplify upon their experience as it is common enough in greater or less degree. The author undertook to inform each of them concerning the color schemes best suited to their type.

The Olive Brunette and her Blue Dress. He told the brunette that she had not fared well in pure blue. She wished to know how he could know this. By observation, partly; largely, however, through an application of the law of simultaneous contrast, according to which it was evident that a blue dress would intensify the yellows and greens in her complexion, changing it from a deep, rich, subtle olive to a jaundiced greenish yellow.

The Blonde and the Same Blue Dress. That very blue so fatal to the Italian would, according to the very same law of contrast, prove most effective on her friend. She was blonde.

White or any pale tint would make her look sweet and dainty. But to make her hair more golden, her skin more beautifully tender and transparent, she might wear the blue which had proved so fatal to her Italian friend. This application of simultaneous contrast, one of the simple and more obvious ones, is applied by many unconscious of the reason but strongly conscious of the attractiveness of the result.

Tables of Simultaneous Contrast. Chevreul, in his work on color, enters at great length into the exposition of the law of simultaneous contrast and gives endless tables containing data concerning the influence of one color on another. But the theory once understood, these tables are not necessary, for the reader can arrive at the result in any given case by a moment's calculation. For example, according to the law of simultaneous contrast, blue will throw a yellowish cast into its adjacent colors, with the following results.

Blue will make yellow seem more intense.
" " " red seem orange by adding yellow to it.
" " " a cool gray, warm.
" " " a warm gray, warmer
" " " a green, yellow green.

Red, according to the laws of simultaneous contrast, tends to throw blue green into adjacent colors. The results follow.

Red will make blue-green seem more intense by contrast.

Red will make yellow seem greenish by adding blue-green to it.

" " " orange seem brown by adding blue-green to it.

" " " warm gray seem less warm by adding blue-green to it.

" " " cool gray seem cooler by contrast.

In these and all following statements concerning simultaneous contrast, the reader is advised to experiment with the colored discs which are furnished with this volume. This collection can be much enlarged and extended, preferably with textures of dress goods, wall papers, wood veneers, and similar materials according to the interest of the experimenter. All experiments should be made with note book handy.

Green, according to the law of simultaneous contrast, throws violet into adjacent colors.

Green will make violet seem more intense.

" " " yellow seem less intense by adding violet to it.

" " " red seem red-violet.

" " " cool gray seem violet in tint.

Yellow will make blue seem intenser.

" " " red, violet, by adding blue to it.

" " " cool gray seem cooler, by adding blue to it.

Blue green will make red seem more intense.

" " " " yellow seem orange, by adding red to it.

Blue green will make orange seem red orange.
" " " " warm gray, warmer.
" " " " cool gray, warm.
Violet will make green more intense.
" " " yellow seem yellow green, by adding green to it.
" " " red seem brownish.
" " " grays seem greenish.

Pigment and Luminosity. The law of simultaneous contrast helps the colorist partly to overcome one of the great difficulties which face him. Pigments are not luminous. The brightest white obtainable is still a dead white; the yellow, orange or red pigment when brushed upon the canvas does not arouse that sensation of intense brilliance which is present in the coloring of nature. It is through the law of simultaneous contrast deliberately applied that the commercial poster artist, the label designer, the tapestry weaver, the painter or the stage costumer can achieve their most powerful color effects. Realizing that if yellow cannot be given the intensity of the stained glass through which light filters, a richness approximating this can be secured by surrounding it with blue; the artist who seeks intensity of coloring uses complementary colors pure, and relies upon simultaneous contrast to give to each its maximum of richness.

"Petrouschka," The Yellow Gown and the Purple Tent. Thus in the Russian Ballet *Petrouschka,* the appeal to the eye is made on the basis

of a purity of colors the differences in which were intensified by contrast. Through the purple curtain of the puppet's tent there appears the master of the dolls, clad in yellow. The shrill notes which he plays upon his pipe, clear and penetrating, have their counterpart in this contrast of a bright yellow made more intensely yellow against a deep dark violet made more intensely violet by simultaneous contrast.

The "Modern" Love of Intense Colors. The result of such contrast when carefully considered is to increase the range of color expressiveness beyond the limits known to the old masters of painting or of stage setting. There was always a great restraint in the older painters, in whose pictures whole areas are black, gray, or very dark brown, and in which the smaller colored areas are far from spectrum purity. Color schemes in which grays predominate have the charm of sweetness and of subtlety, but the discriminating lover of color no longer seeks his harmony by avoiding color; he achieves harmony by mastering it and organizing it, even in its purest, strangest, and most intense notes.

Puritanism and Negative Harmony. Just as there is a negative goodness, so there is a negative harmony. There are many who are called refined because they are unexpressive and never have a personal conviction; they do not raise their voices above a whisper or their minds above a dead level of conformity. So, too, in color many who pride

themselves on their taste are really exercising abnegation. They dress in black gray or dark brown; they dress their children in white. This restraint, this avoidance of anything which might be doubtful or experimental, gives them, they think, the right to laugh at the person who, really loving color, frequently blunders about its use.

Positive Harmony in Bakst. In the Russian Ballet we had an example of the expressiveness of color, its power of great emotional stir when used with a full intensity, enhanced by simultaneous contrast. When associated with music and with motion, and all three are strongly harmonized in such a ballet as *Thamar,* the result is absolutely intoxicating. The effect of riotous abandon in *Thamar* was due to the Bakst color-effects quite as much as to its accompaniment of "modern" music. The rich, glowing oranges, reds and maroons intensified by, as well as intensifying the blues, blue greens, and violets as they revealed themselves when the curtain went up, produced an immediate thrill of blazing Oriental splendor.

Simultaneous Contrast in Impressionism and Post-Impressionism. This use of pure and powerful colors, each more resonant because of the other, is one of the marked features of what has come to be known as the Post-Impressionist group. When they first appeared the Impressionists were greeted as wild men guilty of gross excess in color. Those who are accustomed to the gray-greens and silver of Corot, and to the browns and grays

of the Dutch landscape painters, were startled by the blue water, the white sails, the yellow-green grass, the orange-green foliage, the violet-gray shadows of Monet. People had never seen these colors in art, and so had failed to observe them in nature. But the Impressionists finally won recognition, and their manner of seeing nature has become the fashion. The fine distinction of tint or shade, the exquisite compounds due to the changing character of the atmosphere, are the color effects which the Impressionist uses as the material of his pictures.

The Post-Impressionist agrees with the Impressionist that under the influence of atmosphere colors may become grayed and elusive; that, in fact, night may completely rob color of its body and leave nothing but the ghost of the hue; a gray of green, red, or blue, so vague that the blue can scarcely be determined. But the "modern" insists on a greater freedom of color expression. He is not merely the notator recording. He is the color designer using color freely, as suits him. If he wishes to express force in his work, subtle color will be fatal.

The color schemes he chooses are as strong and irritating when compared with Monet's atmospheric subtleties as is Monet's work when compared with that of Corot. Is it necessarily less true to nature, less objective in inspiration? Hardly. History will repeat itself. History always repeats. The layman learned in time to dis-

cover the truth of the color schemes of the impressionist; that the colors in a Monet were as true and harmonious for a certain kind of light and place as the colors of Corot were for another. He will also learn that the "crude discords" of the new school are faithful and expressive records of nature's more insistent moments, when colors grow purer through simultaneous contrast, and he will learn to enjoy this more vital coloring.

Simultaneous Contrast in Nature. Observe the pansy. The yellow pansy has a blue heart. The blue pansy has a yellow heart. Looking across the river to the west, watching the sunset sky, see how the hill or forest becomes deep blue against the yellow sky. Walk across a city square on a sunlit day, or stroll along the sandy beach on a hot summer afternoon and the intensity of the colors will prove dazzling. There are moderns who welcome this more powerful color orchestration in nature. Seeking to express not the tenderness which Corot recorded, nor the subdued variety of tints which Monet observed, these painters seem at times to be crying out against their pigment for its lack of power and intensity. To such the tendency of colors to intensify one another when used in certain pairs may seem like a special ordainment of an æsthetic providence.

Phases of Simultaneous Contrast.[1] Simultaneous contrast may like every other principle of

[1] Throughout the following the reader by using the colors in the back of the book may verify each of the statements made.

color be studied with reference to the various attributes of color. Colors juxtaposed or superimposed influence one another as regards:

1. Hue. Simultaneous contrast tends to heighten or even to modify hue by seeming to change it.
2. Value. Simultaneous contrast affects value. Darks may appear darker and richer; lights may appear higher and brighter or both may lose their quality.
3. Purity. Simultaneous contrast affects purity, tending to make colors seem grayer or purer according to the character of the colors juxtaposed.
4. Warmth. Simultaneous contrast may appear to increase or diminish the apparent warmth of hues.
5. Advance and Recession. Simultaneous contrast may make some colors seem to jump; or other colors to lose themselves.
6. Weight. Simultaneous contrast may make heavy colors seem more ponderous—light colors more evanescent.

Simultaneous Contrast of Values in Grays. These are considered first because by an experiment with pure grays without hue or any other color attributes to affect the issue, the effect of contrast can be most simply observed.

Five strips of varying grays each one equal in tone present a fluted appearance through simultaneous contrast. (See plate V.)

Here then we observe that contrast gains its effectiveness partly from illusion;—the eye being deceived in the case of a uniform gray area into believing that the gray where it meets the white is darker than where it meets the black. From this it would seem that in a gray painting, if it were decided that a feeling of luminosity and light had been lost and that the gray had been pitched a trifle too low, a judicious spotting of darks might tend to heighten the value by contrast. On the other hand in a night scene if the grays seemed pitched somewhat too high to suggest the darkness of night a few spots of very high value might make the general tone of the picture appear much darker.

Simultaneous Contrast of Value in Hues. In so far as hues juxtaposed or superimposed differ in value, this contrast in value will create the same illusions. The light color will seem to grow lighter; the dark color will seem to grow darker.

Hence a very light red on a dark red will seem lighter by contrast.

A dark red on a light red will seem darker by contrast.

And if the hues are different as well as the values the effect is still the same; except that not only value but also hue is affected. Thus a light red on a dark blue green may become modified in hue;—but in any event it will also become modified in value and seem lighter just as the blue green will seem darker.

Grays and Hues. A light gray alongside a dark color seems lighter.

A dark gray alongside a light color seems darker.

A dark gray alongside of dark colors only muddies them through mixing with them (because of the closeness of value).

A dark gray or black combines well with colors which are high in value.

A light gray or white will mix with and confuse light colors through closeness of value.

In other words if the rich depth of blue, green, or violet or even of a shade of the warmer colors is to be maintained white or light gray is used. If the brilliance of pure yellow, orange, red or of a pure tint of a colder color is to be felt, black or dark grays may be used.

Contrast of Colors as Regards Hue. We have already observed that colors tend to modify one another in hue. There is little to be added to what has previously been said about simultaneous contrast of hues except that it is accompanied by the effects of contrasting of values whenever there is in addition to the difference in hues this difference in values.

Contrast of Colors as Regards Intensity. Pure colors make dull colors lose what little purity they have and tends to gray them, unless the pure and the dull color are complementary.

Pure and Dull Areas of Same Hue. Thus a pure yellow will make a very dull yellow seem still

less intense by throwing blue into it and further graying and dulling it. A pure red will gray a dull red, by throwing blue green into it. Thus two colors may be deadened by simultaneous contrast, just as complementaries may be enlivened by it.

One Pure and One Dull Area of Different Hue (not complementary). A pure yellow alongside a dull red, tends to further dull the red, as the contrast of brilliance makes the dull color seem still duller. Moreover by throwing blue into the red, the latter loses what little purity it had and becomes still grayer.

Broadly stated then this gives us the principle that pure areas alongside of dull areas of different hue but not complementary tends to reduce purity in the latter.

Two Pure Areas of Different Hue (not complementary). Pure yellows alongside of pure reds tend to dull each other through their interaction of hue. The red throws blue-green into the yellow, graying it. The yellow throws blue into the red, making it seem less intense, and moving it towards red-violet.

Two Areas of Complementary Hue.

Intensity and effectiveness are heightened when complementaries are juxtaposed or superimposed.

When both are pure, as pure yellow and pure blue the yellow becomes more brilliant, the blue becomes more brilliant.

When only one color is pure, as in pure yellow

and dull blue the yellow becomes intenser, the blue becomes less dull.

When both are dull, dull yellow and dull blue each becomes less dull.

A Warm and a Cold Color. These intensify one another in character, the warm seeming warmer, the cold colder. Thus red and yellows and oranges and warm browns will never seem as joyous, as warm and glowing as when placed alongside of blue-green, blue-violet and blue.

Contrast as Regards Activity. Colors affect one another in their relative activity. Just as in literature the villain sets off the hero, the passage of quiet description set off the passages of violent action; so in coloring strong, advancing, forceful colors gain in strength, advance and force from juxtaposition with quiet retiring colors. The still quiet of the sky is made more tranquil in its gray blue softness through the brilliance in its twinkling stars. The sun dazzles most against a deep blue expanse.

Active colors juxtaposed lose force.

Inert colors lose interest.

Active and receding colors combined in one scheme intensify by contrast.

CHAPTER XIII

COLOR HARMONY

Color Combination versus Color Organization. Color harmony, in the general meaning of the term, refers to the pleasure which the eye and mind take in certain combinations of hues, whether in nature or in art. Just as given musical notes combine to create chords of sound which are pleasing to the ear and mind, so color tones may combine to form chords of color which stimulate the eye and mind agreeably.

It is unfortunate that color harmony has in the past been considered the result of color combination rather than of color fitness and color organization. Colors have been classified in pairs and "triads" as "fair," "bad," and "good." One writer on the problems of color harmony illustrates his book with colored charts each broken into a hundred squares. Through these charts he demonstrates the color schemes of selected examples of rugs, vases and chinaware. The percentage of each color in a given scheme he represents by so many squares of that color. What is completely overlooked in this statement is that color harmony is much more a matter of arrangement and the organization of the colors employed

than is usually suspected. Two or more colors poorly distributed may create diffused interest or even annoying rivalry; differently arranged they may become fair without being very stimulating or interesting. A further transposition of the notes may make the same color chord quite individual and effective.

Complementarism and Simultaneous Contrast only Starting Points. Complementarism is a good starting-point for color harmony, since it states an important physiological condition worth remembering: namely, the need of balanced retinal stimulation. The law of simultaneous contrast is important since its application enables the designer to enhance or reduce the vitality of one or more of the colors in his schemes. But over and above these are the laws of harmony as they apply in the arts generally, laws which govern the tasteful arrangement and organization of the material.

If color expression is to become an art it must conform to the conditions which obtain in the other arts. Colors must be well composed in the same sense that the sounds in a symphony must be well composed. In a sonnet, a cathedral, or a suspension bridge, the mind demands certain principles of arrangement and plan in the use of the material, which may in the larger sense of the word be called the "fundamentals of harmony"; not of color harmony or poetic harmony or musical harmony, but of all harmony. This chapter will be devoted to a statement of the laws of harmony as they apply

in all the arts and of their special application to color.

Harmony—the Goal of All Endeavor. Harmony is a word which calls up associations of all that is desirable in life, whether in the realm of objects, or in the less tangible realm of moods. In spite of the apparent confusion of daily life, it is the constant goal of man's endeavor. In spite of the apparent chaos in the myriads of phenomena in nature, it constantly evidences itself there too as the unifying principle. Religions result from the attempt to harmonize the facts of self and the universe. The state results from the attempt to harmonize the individual with the group. The family is an attempt to harmonize sex-life with its normal result in dependent offspring. Education is an attempt to harmonize the individual with his environment, socially, politically, industrially.

Harmony Defined. Likeness within Variety. "Harmony," says one philosopher, "is a unity, all the terms of which are in inner accord." This unity implies a *variety* to be harmonized. Unity then is not uniformity. The adage that "variety is the spice of life" tells only half the truth, for variety is the very principle of life, and in design is the prime aid to interest.

Imagine a country in which it is always day of an even light. How oppressive this evenness would become to those accustomed to variety! For those born in a country of continuously even

light, light would become non-existent; absolutely unnoticed for lack of a contrast to set it off. The most beautiful song note sustained forever would become maddening or non-existent. The most lovely of faces, if all faces resembled one another, would soon lose all power of appeal or interest. The most exquisite color, if it were the only color, would soon annoy or disappear.

Variety, however, is quite frequently an irritating spice, as unpleasant in its kick and tang as flatness would be in its lack of both. Though too much of one thing is not pleasurable, too much difference may be equally annoying. Variety may result in the diffusion of interest. It may irritate the attention which it catches. It may fatigue the mind if no inner clarity and binding principle reveals itself. We enter a room in which each object is separately beautiful yet no two belong together. We hear seven sounds simultaneously, but each one, though pleasant in itself, is at war with the rest. In each case variety and difference are present; yet the result is far from agreeable. Variety in its very nature may tend to discord; chaos being the most extreme example of endless variety.

Likeness, then, verges on monotony, and variety is in danger of being discordant. Harmony blends the good of likeness and of variety without their evil. Harmony is the goal of art and life in that it consists of a rational likeness or unity within an agreeable difference or variety. *In*

rational living, as in beautiful expresson, there should be a binding force holding together contrasting elements and interests.

General Law of Harmony. Forms of Order. This orderly unifying element which binds the varying and contrasting parts takes three forms each more or less metrical. They are called rhythm, balance, and proportion. Whatever the art is, whether it employs planes and volumes as in sculpture, action as in drama or tones as in music, these are the three types of arrangement by which the elements are unified.

These three principles are called *Forms of Order* because they are really mathematical arrangements in which an orderly or rational measure is observed. Beauty, the æsthetic pleasure of harmony, seems to be more closely related to mathematical orderly arrangement in which a rational underlying unity is observed, than one might suspect. Beauty is mood, in the popular conception. Yet there is an almost measured relation in the beautiful pattern which seems to belie this popular conception of art and to give ground for the Pythagorean notion that *number or proportion,* measure, arrangement, and a formal orderliness, are inherent not only in the plan of the universe, as its guiding essence, but that they are also the guiding principles in really good design.

A group of independently interesting and attractive units thrown at random on a surface, without a well planned relation to one another

or to the surface, would hardly constitute a beautiful design. They might, in fact, be distressingly bad. Yet homes for a long time were and still are for the most part assembled very much like such a disorderly unreasoned grouping of separately attractive things.

Rhythm, balance, and proportion are the forms of order according to which lines, planes and colors may be composed, (1) so that they themselves have a guiding orderly principle or unity within each part; (2) so that the parts relate to one another in an orderly and unified manner.

Rhythm is the unification of the contrasting elements through related motion in the parts of the design.

Balance is a unification of the contrasting elements through the centering of contrasts.

Proportion is a unification of the contrasting elements through the introduction of a measured relation.

Dominance and subordination are each phases of that central unity which must control throughout the rhythm, balance and proportion.

Rhythm. Rhythm is the form of order which is secured by related motion in the contrasting elements of the design. This related motion is illustrated in the regular relation of accented and unaccented syllables in verse. Music is written in a given time which, as in poetry, indicates a rhythmic recurrence of accents. The sculptor's marble bears a less obvious but none the less deliberately

planned relation of movement in the accented and unaccented elements of line and plane, protuberance and depression. The shop window which has no related movement in the arrangement of its details is disorderly, and therefore unattractive and unpleasant. A well-designed dress is rhythmic in its lines, its draping, and its coloring, in all of which the principal movement must be deliberately planned to be harmonious.

The universal character and application of the principle of rhythm or ordered movement is exemplified in a myriad ways in nature. Rhythm is exemplified in the veining of leaves, the branching of trees, the spiral lines of sea shells, the spider's web, the crest and trough of the rolling waves, in all of which the lines move with a clearly related unity within their various paths. The alternation of night and day, the beating of the heart, the very breath of life is rhythmic like the accent in poetry.

Color Rhythm. Since motion is, to judge from the success of the moving pictures, a prime aid to interest, we can realize the importance of an understanding of color rhythm in design. The moment we have colors on an area, the eye, in exploring that area, will sense motion in the design. The mere feeling of motion, however, is not enough. If the eye is to take pleasure in the motion, the motion must be agreeably related and unified.

In what manner can color be used so that a

feeling of related motion is created? Obviously, through regular repetition, through alternation, or through a progression of gradual increase or decrease in value, intensity, warmth, weight, or force.

Flat Color vs. Gradation. Flat color, if it were possible, would be a most offensively dead thing. So eager is the eye for variety and contrast that rhythm of color, whether through repetition, alternation, or through a graduated increase or decrease in its qualities is a great aid to a pleasurable feeling in the contemplation of color. Nature never creates a perfectly flat tone, dead in finish and lacking in variety. Man sometimes tries to accomplish this, but it is well nigh impossible. However, it is not enough to rely upon accidental gradation.

Gradation is to painting and color what it is to music,—one of its finest means for emotional suggestion. A violinist plays a single note and summons from it by modulation a wealth of variety. Vermeer uses a yellow, and passing it through a few gradations from a dull to a brilliant gold stirs us as a violinist might by the beauty of his modulations.

Rhythm of Color Gradation may be produced through a gradual increase or decrease of the values, through the gradual increase or decrease of intensity, or through the gradual change of hue. A progression from pale blue very near white to deep blue almost black is a rhythm in value. A

blue sky, though usually thought of as an ungraded blue, is in truth a rhythmic gradation of values of blue. A progression from a pure intense green in the fields in the foreground through reduced intensities of green to greenish grays in the distance represents the gradation of intensities in nature. The gradation of color from a yellow green in the foreground to green in the middle ground to blue green beyond to blue in the distance represents a gradation of hue. The beauty of certain textures like satin resides very largely in the fact that the light as it plays upon them produces a natural gradation of values, intensities and hues. A yellow satin registers in its folds not only a rhythmic movement of values and intensities but even of hues, playing through yellow orange to orange and even blue.

Color Rhythm in Line. Gradation and Direction of Lines. When a line is drawn it creates a moving path which holds the eye through the contrast of its color with that of the ground upon which it rests. If there is a feeling of unity within that movement as in an oval, an "S curve" or a spiral curve it becomes agreeable even as a line. The movement within a given line can be intensified by a gradation in the stroke, which may grow gradually fuller or thinner. Much of the charm of good draughtsmanship and brush work comes from such a gradation of value in the lines. A drawing in which the lines reveal no gradation or accenting would be like a voice without inflec-

tion. In a dress, folds or pleats create what are virtually accented lines.

When there is a feeling of unity or relation between the movement of a line and the movement of the lines or planes which surround it, the effect of rhythm is enhanced.

Color Rhythm through Parallelism. An important principle in color arrangement is *parallelism, which is the effect of lines, planes, or masses all moving in one direction.* Parallelism tends to enhance the feeling of movement and is moreover responsible for illusions which can be utilized in color expression. Painters and sculptors seeking to create the feeling of a given movement will repeat the main line of that movement in the accessories. Millet's *Gleaners* all bend in one direction and the parallelism of all the curves enhances the effect of the slow bending action in each. But the application is quite definite even in dress design and home planning. Many lines moving vertically enhance the feeling of height. The parallelism of many horizontal lines will tend to increase the feeling of width. Figures or rooms may be made to seem higher or lower through the use of parallel horizontals or verticals.

Color Repetition. Formal and Informal. The feeling of rhythm or related motion can be secured through a planned repetition of a given color throughout the area of the design. A dress, no matter how well chosen in color, if decorated with

just one note of contrast in a collar for example, would be lacking in the rhythmic quality which would come from a repetition of that note in a touch of color in the hat, beads or flowers. The eye takes pleasure in being led by graded steps from note to note. Gradation of color, and the movement of lines are two means towards affording the pleasure of related movement in color. Repetition is another.

The repetition can be formal, as in the case of striping, or informal, as in the case of the collar just mentioned. The note of that collar, if not repeated either exactly or with variations of intensity and value, would stand out detached and unrelated. In a beautiful rug or a painting by a colorist, the designer can study the application of informal repetition and the interesting manner in which the two principal colors recur in the detail. It is a significant fact that every great colorist was a color composer. He is a colorist not because his "colors go well together" but because they are well organized.

Rhythm towards a Climax. In planning the movement of color interest in a design, it is desirable in the interest of dominance, of clarity and effectiveness to organize the colors so that the rhythm is towards the point of greatest interest, which should receive the strongest color treatment. One means to this end is a gradation or gradual movement in value or intensity towards

the point of greatest emphasis, which can be further reënforced in its interest, by introducing at that point the strongest contrast. Thus the blue collar at the neck might be very pure and very dark against the flesh and the dress goods; the blue notes in sash, dress, border or bag might be graded from gray blue to that climax of pure blue.

Balance. This is the form of order which is secured by centralizing the interest of the design, through the judicious arrangement of its elements. In music, sweet soft passages, highly intricate and embroidered, balance powerful passages simple in mass and detail. In the drama, the character of Caliban is balanced by the introduction of Ariel, Miranda and Prospero. The balance may be with regard to character, to action, to movement or to any of the other elements of interest.

In aiming at variety, the elements of tragedy and comedy, accompaniment and melody, dark and light must be so related that the pattern presents a judicious weaving of these elements into a unified effect. No matter how much force action or even conflict the designer or composer seeks to express, there must be a center or axis to which the elements relate so that the structure is nevertheless poised. Just as a building must conform to structural principles which arouse a feeling of stability, so a play, a symphony, a rug, a dress or a room interior must be balanced in structure, the separate interests

grouping themselves around the central interest with a more or less clearly perceived order. This does not mean that a color composition must be as formally composed as a Greek temple; it may be as playful as a Persian illumination or a Gothic cathedral. It may be a scherzo in color mood but even then the parts may be so adjusted that the interest is centered.

Color Balance. Given an area, a blank white page or a blank black page, how other than by rhythm can color be introduced to add interest, variety and contrast in an agreeable and orderly manner? There are three ways:

a. By symmetrical color spotting.
b. By radiating spotting.
c. By informal or non-geometrical color spotting, so disposed as to keep the interest centered.

Whether we employ a, b or c, the problem is in all cases this: the maintenance of agreeable poise in the disposition of the colors. A small black area, if agreeable in shape, may need no breaking up. The same shaped area enlarged will prove oppressive if it is one solid color. Breaking up by spotting, whether symmetrical, radiating or informal, introduces a contrast, and if only the proportion of the two or more tones is accurately gauged, a balanced color interest can be created within the variety.

Symmetry in Color Balance. Color may be centralized most obviously by having equal and like

masses placed in opposition on both sides of a center line. The face with its blue eyes, its eyebrows each side of the center, is an example of a formal color balance. So, too, is a flower seen in front view. When the shape to be decorated is symmetrical, color symmetry is generally employed. In the treatment of vertical surfaces such as walls, symmetry of color arrangement is in place because here logic and construction demand in some of the severer rooms an easily perceived order. But symmetry, in spite of its attractiveness, is in danger of failing to maintain interest through its obviousness. It is, however, very restful, because of this very characteristic.

Radiation in Color. Color may be centralized by arranging it all around a center at equal distances as in the top view of a flower like the daisy. Radiation of color is appropriate to the treatment of horizontal surfaces. Symmetry dictates the point of view, and is therefore suitable to the vertical plane. Radiation permits of a shifting point of view and is therefore suitable to horizontal planes like floors, where it is used for rugs.

Informal Balance of Color. Broken Tones. Given an area all black, brown, red or any other solid color, we may add to its interest and avoid its oppressiveness by any free breaking up of the whole area which will introduce an element of contrast into it. The result is best when the two values or hues are so interrelated that the result is not a pronounced rivalry of two separate areas

of color, but is instead a decided balance of a middle tone.

In what is spoken of as blue and white china, the blue is generally a blue spotted with white instead of a detached and separate hue. And in border bands, whatever the unit, the effect usually sought is of one continuous middle tone rather than of a series of detached tones throughout the area. In textiles of one color the texture itself frequently furnishes this balance of two colors. Thus monk's cloth and arras even in solid colors really present a vibrating broken color surface consisting of the play of two tones; that of the weave as it catches light, and that of the weave as it misses light or is in shadow. Satin, through crinkling, or even when stretched flat, is so sensitive in its texture that the whole surface reveals the balanced play of subtle gradations of value, intensity and even of hue.

Informal Balance of Color. Area Against Area. We have just considered balance through the breaking up of a total area of one color into a tone of middle value through the play of two colors. But there is a different kind of informal color balance. Consider the book cover. The cover is grayed yellow, the lettering is black, and there is an ornamental spot of a third color. The principle to remember is that the most forceful note of contrast must be at or near the natural center of interest; in this case, the title. The spotting of the oblong areas of lettering and of

the ornament both as regards the size of each area and the amount of color contrast in each is a problem in informal balance. Top heaviness, interest centered too near the base, a degree of interest in the ornamental spot which would outweigh the title, must be avoided. In informal balance in fact every element in the design may be regarded as having a weight of interest resulting from its size, its character of color, its contrast with the background, its line. The balance of these weights is by no means simple, but the effect of a well balanced design in which there is this variety of apparently free play is well worth the effort. Persian illumination, Chinese paintings, Japanese fans illustrate this type of balance.

Balance of Hues. In the daisy we have a formal balance, small white spots surrounding a central yellow. In the pansy we have an informal balance; a small central spot of intense yellow balances the radiating violet tints or shades, or a small spot of intense violet balances radiating yellows. The blue medallion of the rug balances the yellows and oranges and grays of the border.

Balance of Values. A design all dark in value would be gloomy; all light in value it would be glaring. In the flowers just considered the yellow and purple of the pansy balanced in value. The yellows were very light, the violet tones were very dark. Contrast of value is more essential to interest than contrast of hue.

Balance of Intensities. A small spot of pure

color may outweigh a large area of dulled or grayed color. For this reason, the spotting of pure notes must be very carefully considered. A large unit at the top of a design, if too intense in color, will make the scheme top heavy. In a general sense it may be said (a), that the pure notes should be smaller than the grayed notes; (b), that the grays should be used for backgrounds and the purer color for ornament; (c), that the pure notes may be used symmetrically or radially, but if used in informal balance they should be at or near the logical center of interest.

Balance of Warm and Cold. This is observable in nature and certainly is most desirable in design. All warm is flushed; all cold tends to chilliness. The warm yellow balances the cold purple of the pansy. The blue green grass balances the yellow orange and red of the flowers. In painting, the great colorists have all observed the balance of cool and warm colors.

Balance of Advancing and Receding Colors. In good composition this balance is generally sought. Backgrounds are, as a rule, painted in receding colors, figures in advancing colors. Whether in a dress, in a room or in a painting, the composition is built upon this principle of advancing and forceful color notes set against supporting tones. A room all in advancing colors would be too insistent; all in receding colors it would prove too self-effacing.

Analysis of Complementaries as Regards Bal-

ance of Contrasts. If we now examine any set of complementary colors, we shall discover a prime fact in the study of color combination. Consider yellow and blue for example. As regards hue they are different and yet there is a pleasurable total effect because they sum up as a balanced unit, i. e., light, and avoid excessive stimulation of either set of nerve endings. As regards value at their spectrum purity they balance in their contrasts; blue is low in value, yellow is high in value. As regards warmth, they balance while they contrast. Yellow is very warm. Blue is very cold. As regards activity, blue is receding, yellow is advancing. In a color scheme of pure yellow and blue we have, then, an extreme contrast or difference in values, warmth, activity and hue.

Danger of Rivalry in the Use of Complementaries. But complementaries are in danger through their many contrasts of offending against a unity of effect. The logic of plan in any of the arts demands dominance. A two color scheme with neither color stronger or prevailing, creates a rivalry in which attention is pulled without a rest point from one to the other. In check goods or rugs where the two colors are sufficiently broken, we arrive at a middle tone of vibrating character. But where the areas are large and separate and neither prevails, the resulting shifting eye movements may prove annoying.

Proportion Defined. Proportion is a unifying

element of measure relation in the colors of a design. Any composition, whatever the art, has a variety of elements in it. If these bear the proportion of one to one, in other words, if they are present in equal parts, there is a uniformity of measure which is deadly. Some element of the design should master and control the rest, which as subordinates serve to enhance its interest. Variety of measure is not enough. The measure should give one a sense of rightness, through throwing the accent of interest on what should logically be dominant. Not only is it true, in a general sense, that the note which logically should be dominant is to be made dominant through receiving its proportion of interest in character of treatment, mass, detail, or color; but it is also true that in some arts like cabinet-making and architecture, proportion is absolutely arithmetical. Thus, in a Greek temple, a Gothic cathedral, a chest, or even a title-page there may be a definite ratio of two to three or some similar formula running through all the measures.

Proportion in Quantity of Hues. The element of proportion is very important in estimating a color harmony. It may be considered first as the actual quantitative relation of the colors in a harmonious scheme. How much black is needed for a given area of white? How much blue of a given value and intensity will balance so much yellow of given value and intensity. The answer according to the physicist is that when the sum of the two

produces gray the proportions are right. But this type of proportion, even if it can be accurately and mathematically determined and measured, must for ordinary purposes be summed up in the three propositions which can be applied with the trained eye as the judge.

1. Small areas of advancing colors of given intensity and value, require proportionally larger areas of receding colors.
2. Small areas of intense colors of given advance and value require proportionally large areas of dulled colors.
3. Where two or more of the factors making for strength are in the one color, a proportionally larger area of weaker color will be needed to balance its activity and force.

Proportion in Arrangement of Hues. But besides the quantitative element, there is the element of arrangement as regards spacing and relation of areas. In this connection the principle of proportion calls for a feeling of *measured relation* in the color areas. Analysis of a wall in a room as regards the wainscoting, the papered section, the width of the moulding, the border above reveals four bands of color. These, no matter how well chosen in themselves, may be out of harmony if the relation between the width of these panels is not an agreeable one. To illustrate this, assume that those four panels are each exactly one fourth of the height of the wall and picture the unpleasant effect of that uniformity.

Consider a page of print. The printed area mixes for the eye as a middle gray. The margins are so many areas of white. The scheme, then, is white and gray. Let the margins be a quarter of an inch; the proportion of white to gray is poor quantitatively and, in addition, the lack of a feeling of measured relation between the white and the grays will offend as it would in the wall. In an initial letter on this same page there will be a certain size of rectangle which will be right, because it will strike a measured relation with the white oblongs of the margins and the larger rectangle of the gray print. Title pages, posters, buildings, dresses, interiors all present problems in the measured relation of colored areas.

Harmony. Agreeable Novelty and Experiment. Agreeable novelty is one of the aims of all artistic expression and this can be arrived at only through the habit of experiment. The designer must approach the dress, the room, the circular or the poster with a feeling that within the sure foundation laws of harmony, there are new and interesting color arrangements to be discovered. He must throw aside the obvious but commonplace first, second, third and tenth layout in his search for the one which has a note which raises it above the plane of being merely adequate.

The average designer competing for a poster does not seem to realize that the first idea which occurs to him may have occurred to a hundred others who are submitting their work, that his

mere skill in lettering neatly or drawing correctly may be matched by many in that hundred, and that his success or failure as a high-grade designer will depend upon his avoiding the obvious, the commonplace, the undistinguished. Just as there are tens of thousands, probably hundreds of thousands of people who play the violin, but only a limited number worth listening to in concerts, so there are thousands of commercial artists and artistic printers with only a very occasional one who can do a job which is more than commonplace. In color expression as in any other art there is room for the personal equation, for experiment and for novelty in combination and arrangement, which will not be at the expense of taste.

Great artists were frequently criticized as sensationalists at the beginning of their careers, yet one function of all great art has been to provide the world with new and interesting sensations. These have in a way extended the boundaries of experience. In painting, the chiaroscuro in a Da Vinci, the atmosphere in a Velasquez or a Vermeer, the sense of space in a Lorraine or a Turner, the sunlight in Monet were all contributions of a somewhat sensational character, distinguished by novelty from the commonplace repetition of impersonal work which finds no place in art history.

Originality is not a crime. Nor is the straining after it a mistake in color expression, if only it is based on a foundation of taste and knowledge.

The law of contrast works peculiarly. A given color effect may have stimulated attention at one time through the contrasts which it presented to the eye and mind, contrasts of value, hue, intensity and texture. Though such a scheme were to represent, on tabulation, maximum efficiency of agreeable contrast within itself, if that scheme became so common that ninety-nine out of a hundred posters were using approximately the same type of spacing and color combinations, it would lose its effect. The law of contrast operates not only within the one work but between one work and all other works in the same category. As a result the designer who aims to catch and hold attention must constantly experiment and search for novelty.

CHAPTER XI

CONTRASTING COLOR SCHEMES

Contrasts in Nature. In the night, at dawn and at twilight, color is gray, quiet, subdued and restful; but at high noon, when the sun is burning fiercely bright in the blue sky, the yellow sand, the brown tree trunk, the red hull of the boat, the greenish water, the white sails, all stand out clear and sharp in their contrasts. Force and movement which we feel in the massing waves, the ridges of the sand, the tossing of the boat, the flapping of the sails, are expressed also by the intensity and violence of the color contrasts.

Just as nature when she is forceful is also powerfully colorful, so art when it seeks to be dynamic, to catch and hold attention, must resort to intense hues. The fence poster which is to influence the automobilist speeding by, the chorus costumes which are to stimulate the tired business clerk in the gallery, the national flags which are to stir the emotions of the populace, these must be rich in color and strong in contrast.

If harmony is to be obtained in color schemes based on extreme contrasts it will be only with great difficulty and sure knowledge.

Color "Refinement" and Color Timidity. A

poor colorist may hide his ignorance behind vague grays. Amateurs taught water color or chalk drawing are given tinted sheets which enable them to secure easy harmonies by throwing the common tint of the paper into every color applied. Most people to-day avoid pure colors in large masses. They have grown up in subdued schemes and having been taught to prefer subdued schemes they end by believing that strong colors are necessarily vulgar and coarse. But that pure colors may be most beautiful and expressive of good taste, if used with knowledge, a study of Persian illumination, of Oriental rugs, of eighteenth century palace art, of Chinese pottery will amply prove. Although it is true, as we have seen, that pure colors juxtaposed are insistently contrasting, there are ways of introducing a unifying element which will bind and hold them. Strength, unless controlled, is always in danger of verging on brutality, but that is no reason why strength is to be taboo.

The maximum contrast in color schemes is secured through the simultaneous contrast of pure complementaries. But complementaries, though they sum up as balanced retinal stimulation, tend to be over-sharp, insistent and irritating. Some of the conditions to be remembered in employing them, and the means by which their disagreeable features can be modified in the interest of harmony, are problems to which this chapter devotes itself.

Mood of Contrasting Color Schemes. A contrasting harmony, strong, sharp and clear, should be chosen only when force, snap and energy enter into the mood to be suggested. In advertising perfumes, one would hardly expect a color scheme of strongly contrasting blue, green and red. On a booklet cover advertising machinery one would be surprised to find gray and gray green, pale pink and silver. In each case the display rooms and offices of the firms might likewise be expected to avoid the incongruity of a color scheme out of harmony with the associations of the commodities offered.

A recent issue of *The Iron Age* had as a decorative frame for the lettering of the title, a broad area of light grays and pale pinks. Only the closest study enabled one to see that the border was not a gentle spring poem composed of blossoms and atmosphere, but a conventionalized treatment of factories. That cover should rather have been strong in contrast to suggest force. Banking circulars should suggest stability; exotic coloring would be out of place in them. Strong contrasts of pure colors would fail to suggest the novelty and exquisiteness of a perfume. A poster for a melodramatic movie scenario might properly be extreme in contrasts. The emotional climax of a play might be given a stage setting in intense contrasting colors, but the witticisms and badinage of a conversational scene would need a more sophisticated and subtle setting. In each case the

color mood, whether of strong contrast, of reduced contrast, or of close analogy, is dictated in part by the mood or association which is proper to the thing decorated.

The Time Element in Contrasting Harmony. A factor in the choice of a color scheme should be the element of time exposure. People speak about plays that can be seen again or novels that will bear rereading, and even of pictures with which one can live, but the power of certain color combinations to remain pleasing, the tendency of other color combinations to grow increasingly irritating is a fact usually ignored.

It was seen how any one color tended to fatigue the nerve endings responding to that color. Hence the very first application of the principle of time exposure in harmony is that any single color without contrast will prove tiring if used on a surface where it will remain in view a long time. The larger the area the more tiring would be the effect. The monotony of tiled floors, ceilings, and walls so typical of many lunch rooms makes lounging impossible. Few people ever linger to chat or to read their papers in one of those eye-chilling places. Though the glare of the tiles adds to the inhospitality of all white rooms, any other solid color used so extensively would prove disturbing. The retina seems to demand some contrast and variety in so large an area.

Two contrasting colors may be very strongly contrasting when they are to be in view only a

short while, as, for example, the fence poster on the street, the costumes of two dancers on the stage, the cover of a circular which must "get its punch over" at the one reading because in its very nature it is not likely to be kept lying around. But in a room interior one must carefully estimate whether the first impression of agreeable stimulation and novelty will not give way to a feeling of fatigue through the over-insistence of the colors used. A powerfully contrasting scheme with rivalry in the two color areas at its maximum will catch the attention, but there are few effects in color more irritating, if kept in the field of vision for any length of time.

Distance and Contrasting Color Schemes. Shaw said of the Impressionists that they asked the gallery visitors to stand fourteen feet from the pictures instead of four, and that this change of focal distance created a revolution in art. According to him, then, the Impressionist scheme is a simple and pleasing enough harmony, which would never have offended its early critics, if they could have been persuaded to stand far enough off. In this statement he has hit upon an important principle in color harmony, realizing as he does the effect of distance in reducing the sharper contrasts of pure colors. Just as the grand opera singer requires the opera house and can rarely if ever adapt his interpretations to the intimacies of a recital chamber, just as a lyric singer should properly never give a recital in an opera house, so,

too, color schemes have their appropriate optic range. The color schemes which look so well in the Russian Ballet were never meant to be used as they are being used by some decorators for intimate interiors, in rooms sixteen by twenty feet; nor are the colors of the Bakst costumes meant for afternoon tea gowns in small studios where they lack the distance which is necessary to blend them. Stage effects are meant to carry to the gallery. They are not appropriate at close range.

Outdoors, building façades, show windows and posters, may all have recourse to the stronger contrasts. Indoors, theatrical settings and costumes may also be treated in strong contrast; but the close-up color effects which are to be kept in view for any length of time, if large in area, had best be kept more restrained.

Function and Contrasting Color Schemes. Since strong contrast accentuates and draws attention to itself, it becomes obvious that it should be reserved for the points of prime interest, and that it should be particularly avoided where the attention is not to be focussed.

For this reason, floor coverings should receive a minimum of strongly contrasting colors. The Chinese rug with its black irregular pattern on a golden ground is, in spite of its rich beauty, a false note in most room interiors. It is generally impossible to graduate up from this to ever-increasing and more interesting contrasts. That

a purse should carry its strongest contrast of color accent at the clasp, a gown at the neck, a book-cover at the title, are a few of the simple corollaries of the principle of fitness to function in contrasting color harmony.

Black and White. Extreme Value Contrast. A color scheme based on black and white represents the most extreme contrast of values possible. The commercial artist or business man eager to economize in his advertising (for color printing is expensive) may secure considerable force and attention-holding power through a judicious use of black and white. It is essential to the effectiveness of these colors that they appear in large separate areas, for if they are present only in small spots, the result is a broken gray. The soft gray of the newspaper copy is composed of the same two colors, as are the headings. But the large masses of the black ink in the headings set against larger whites are the interest-arousing factors.

Even a newspaper as conservative as the New York *Times* still realizes the drawing power of well-planned news captions on the front page. Recently a morning paper coming out for the first time under new auspices was handed to the writer. As he glanced at this newspaper and then at the *Times* beside it on the stand, there was something about the contrast of the *Times* headlines which made the news there seem more important than that conveyed by the grayer, more uniform captions of the other. The value of a

good understanding of black and white contrast even in a "refined" journal is one which the circulation manager of the new sheet could well have afforded to look into.

Black and white schemes, then, are undoubtedly effective, but are they harmonious? As color they will not produce over-stimulation of the retina. If annoying or irritating it will be on account of the arrangement of the spotting or the insistence of the contours. Moreover, weakness of design as regards grace or construction will show sooner in a black silhouette than in a pale gray one. So, too, will poor quality of proportion in the margins and masses of a printed page. Poor placing of caption lines and indentions will show up more prominently where the printing is in the large black type. Poor proportions of white to black, poor placing of the line or two of lettering, will shriek out aloud in a black and white poster. Where the surface decorated is large and seen at close range, as in a floor, large black and white tiles, unless broken up by rugs, may become annoyingly insistent. A broad black and white striped shirt-waist may look well on the tennis court, but it is too pronounced in a sitting room.

Black and white may become irritating in their effectiveness although their proportions and scale be just, if the lines bounding the white and black areas add too much to the effectiveness. Thus black and white checks and stripes tend to be rather dazzling, causing a constant shifting of

the eyes, and a black and white design composed of swirling lines may be as unpleasantly exciting as a merry-go-round moving too rapidly.

Academic art teachers are fearful of permitting their pupils to take up painting before draughtsmanship has been well studied in black and white because they are convinced, and with much justice, that the blandishments of variety in hue can easily blind one to weaknesses in construction or in proportion, which stand out so clearly in the unrelieved black and white.

The Time Element in Black and White Harmony. The show rooms of one of the leading costumers in New York are in large black and white checks carried out consistently throughout the furnishings. The first impression is rather attractive. As the contrasts are wholly of value, and no other contrasting elements enter, there is an easily perceived unity within the contrast which pleases. But any person who is unstable of nerves, will soon find those black and white squares shriekingly insistent; the most stolid will find a spirit of unrest mastering them.

Black and white kept strongly contrasting in area will not wear well as a room scheme or in any place where the eye will be obliged to deal with the areas a long while.

Black and One Color. If one color is to be used with black alone (or in a scheme where black predominates and contrast is desired) it is obvious that the high-pitched warm colors are preferable.

Pale yellow would hardly be worth while as the great contrast in value would make it seem almost white. Red or orange or a deep rich yellow (quite often gold) would be most striking. These used pure are at the same time balancing colors, complementing the low value, the passivity and coldness of black. Black at the same time enhances and enriches the warmth and glow of these colors. A color used with black should preferably be full in intensity as well as high in value.

In balancing a scheme of black and one color it must be remembered that black in its depth of value suggests weight. A little Greenwich Village dining-room was designed with orange walls and a black ceiling. The black ceiling, intended as it was to set off the light of large lamps glowing like harvest moons, was so heavy that it seemed to rest right on the heads of the occupants.

Black and blue, black and green, or black and violet are rather depressing, unless the second color in each case is high in value and quite pure, or unless the textures are quite rich, glossy or in some way highly attractive.

White and One Color. If one color is to be used with white, which is relatively warm, it will be found that for strong contrast obviously the dark cool colors, blue, green and violet are best. Blue and white is the famous combination in pottery. The sailor waist, and the blue and white striped pattern demonstrate the effectiveness of this scheme. The white clouds in the blue sky,

the white sails on the blue sea, also illustrate the appeal of blue and white. Blue and white combine better than green and white because white in its gradations varies from yellowish high lights, complementary to blue, to yellow bluish half tones and shadows blending into blue.

Here as in the case of black and one color, value contrast is most essential to interest and effectiveness. The printer who uses a pale yellow on a white ground is adding to the cost of a job and simultaneously reducing its value. For yellow print can hardly be read on a white ground. Similarly black ink on a brown or dark blue or dark green stock will be almost illegible. Once again it may be repeated that more important than contrast of hue is contrast of value.

Two Color Schemes. If a contrasting scheme is to be limited to two colors, complementaries make a good starting-point, but these as we have seen may make for irritation and sharpness of effect through their many contrasting elements. How can a two color complementary scheme be so modified that its contrasts of hues, value, warmth and activity will be preserved and yet be sufficiently reduced to avoid shock?

Modes for Harmonizing Complementaries. Blue and Yellow.—1. *Dulling the Blue by Adding Yellow.* Yellow added to the blue by mixture dulls and grays it. The yellow area loses something of its intensity through the reduced contrast. And the blue is now higher in value somewhat

nearer yellow in hue, as well as somewhat nearer yellow in warmth.

2. *Dulling the Yellow by Adding Blue.* Where the yellow is the larger area it may be advisable to dull the yellow rather than the blue. Yellow is now closer to blue in value, hue and coolness.

3. *Dulling Both.* If each color is slightly dulled by mixture with the other, contrast will still be present. This is advisable where both areas are quite large, and the rivalry must be avoided. Dulling both brings each some part of the way towards the other, considerably lessening the contrast. However, if both are too much dulled, as in the graying of colors at twilight, contrast disappears and analogous or related harmony is the result.

4. *Checking or Spotting.* Keeping both pure in an interplay of small spots or checks of each creates a vibrating area of middle tone. If these spots become too small, the result is a blended middle tone in which contrasts are lost, as in stippling or "pepper and salt" effects.

5. *Reducing the Value of the Yellow.* When the yellow is made lower in value, by adding black, its contrast with the blue is reduced by just that much. If the yellow is too much reduced in value, the strength of the contrast may disappear.

6. *Raising the Value of the Blue.* Adding white to the blue brings it close to the pure yellow in value, but here too there is danger of losing the strength of the contrast.

Complementary Schemes in Two Colors. It would seem then that any two complementaries, *a* and *b,* can be made less shrill in their contrasts by

1. dulling (a) by admixture of (b)
2. dulling (b) by admixture of (a)
3. dulling both (a) and (b)
4. spotting (a) with (b)
5. spotting (b) with (a)
6. spotting (a) with (b) and (b) with (a) as in a Kermanshah rug.
7. Reducing the value of the high-pitched color.
8. Raising the value of the low-pitched color.

Any one of the above methods may, however, when the contrasts are sufficiently reduced, bring the scheme into the field of analogous harmony where the emphasis is on the agreeable likeness of the colors rather than on their interesting differences.

Rivalry. Rivalry is almost inevitable in a complementary scheme in which the colors are used pure and of even areas, unless methods 4, 5 and 6 are used to bind the two areas. In a room conceived in blue and orange, where there is danger of rivalry between the blue walls and the orange method 3 would be used in the selection of a dulled blue and a dulled orange. In addition the hangings could be of changeable texture in which the blue and the orange would interplay; or if of less subtle texture, the shadows in the soft folds would be bluish. The walls, on the other

hand, could have pictures of orange and blue tones. These treatments of hangings and wall-covering would fall under method 6.

Dominance in Two Complementary Colors. In that room, however, either the blue or the orange would have to be the dominant note. If the furniture, the hangings, the pictures and their frames, the rugs, the ceiling and pottery were all to run to red, gold, orange and yellow, in varying values and intensities, and the note was to be dominantly orange, the blue would act as the subordinate background note, the stage setting for the action of the dominant color. If blue were to be made dominant, the hangings could be blue with an orange sheen or trimming, the upholstery of the chairs would be blue, as would also the pottery and the tones of the ceiling. In this case the room would be a cool blue room with decorative touches of orange to set it off.

Two Colors and Black. Where there is a two color scheme like yellow and blue and the high pitched color yellow predominates, black can be used either by admixture to gray this high pitched color, or by spotting to produce broken tones. The black added to the yellow by spotting increases the variety but makes for reduced contrast by lowering the values, warmth, and activity of yellow, bringing it closer to blue. Too much black added to the yellow would tend towards analogous harmony.

Black added to the blue or used as a separate

area of color would increase the color contrast, by enlarging the area of dark passive color.

Two Colors and White. When a dark color, green, blue or violet predominates, white may be used by admixture to reduce the value of the dark blue or as a third color to break up the dark area.

Contrasting Schemes of Three or More Colors. A blue wallpaper and a solid golden yellow hanging may seem to be a scheme of blue and yellow. But the hanging will vary through its draping and the character of its texture from shrill yellow in the high light through yellow-orange to orange to orange-red. If this scheme is reversed and the wall is a flat golden tone, the hanging of blue will vary from a shrill blue to blue to blue-green to green to yellow-greens.

This natural gradation within any given color suggests the basis on which contrasting schemes of three or more colors may best be worked out. The contrast is kept a contrast of complementaries in the main, except that on one side, either in the small area of accepted decoration, or in the large area of dominant hue, the complementary note runs through a number of related hues.

Thus a blue and yellow scheme might be

	Large Area	*Small Area.*
1. *Dominantly Blue*	blue blue-green green blue-violet violet	yellow

2. *Dominantly Blue*	*Large Area*	*Small Area*
	blue	yellow
		yellow-orange
		orange
		yellow-green
		green
3. *Dominantly Yellow*	*Large Area*	
	yellow	blue
		blue-green
		green
		blue-violet
		violet
4. *Dominantly Yellow*	*Large Area*	*Small Area*
	yellow	blue
	yellow-orange	
	orange	
	yellow-green	
	green	

In like manner plausible schemes for blue-green and red, green and violet can be worked out on this basis. But once again the reader must be reminded that so very much depends upon the exact value, intensities and arrangement of all the hues in any of these schemes.

CHAPTER XV

ANALOGOUS COLOR SCHEMES

Quiet Color Schemes in Nature. Contrasting color schemes are those in which the emphasis is upon the variety, which is sometimes strained to the point of discord. In analogous harmony the emphasis is upon a well observed unity, which is in danger of monotony or uniformity. In the former chapter means were considered for achieving unity, in spite of great contrast and variety in the colors. In the present chapter the problem is that of obtaining color interest and variety, in spite of an almost obvious unity or close relationship in the colors used.

It was observed how forceful and dynamic nature seems when her colors are strongly contrasting. High noon, is usually marked by shrill, intense high value colors set off by shadows cool and dark. The sun goes down after the storm in a blaze of glory, with brilliant blues and reds and oranges, set off by dark bands of violet clouds. But the trembling grays of dawn, the spectral violets of twilight, these and the soft grays of night in the country, are schemes in which colors are closely related and a strong dominant note of gray, soft blue or soft violet permeates the atmos-

phere and bathes all its forms. The colors of a wet drizzly day, of a luminous gray day; or in a higher key, the hues of mother-of-pearl or opal—these are all examples of analogous harmony in nature.

Sensitive people, who dislike glare and blare, force and swift movement, are naturally fond of the charms of analogous harmonies, of mists, of drizzly grays and of the twilight hour. Analogous colors though closely related possess a subtle and tender but none the less deep appeal to the lover of nature.

Schemes in Close Grays. If one is seeking refinement in color harmony, eager for a marked likeness with the minimum of contrasts, no easier way can be found than harmonizing in grays of black and white. For black and white schemes, though they present the maximum contrast of value, involve no contrast of warmth or hue. If this value contrast is reduced through the choice of grays closely related in value, we have quite obviously analogous schemes. With black use dark gray, with white use light grays; with middle gray use light or dark gray; and one has harmonies almost too close in their likeness to be pleasing and effective.

Striped wall-paper in close values of gray may be used for sleeping rooms, for here the element of interest and attention-holding power is reduced to a minimum. But in textiles where gray is the color desired and yet its quiet and sober effect is

to be offset, a note of liveliness can be created by the spotting. In plaids and checks and close weaves of two grays there is in addition to the movement of lines vertical, horizontal and diagonal, an element of vibration, which tends to enliven the effect. Silver-point etching, charcoal drawing, pencil, pen and ink drawing reveal how much pleasure may reside in the agreeable balance of close values of gray.

Rhythmic Gradation in Close Values of Gray. If close grays are unobtrusive in check and stripe, how much softer and still more subtle are they in gradation. Look very closely at the border of this page. See how almost imperceptibly the values of that white vary and fluctuate even for the smallest area. Through the slight swelling of the page as it lies there loosely, every part of it reflects light at a different angle, so modifying its own value. Look at a gray wall. Observe that it is more truly a wall of many grays each playing softly into the other.

Paneling, Checking, Gradation of Grays. Color schemes in grays, although tending to monotony may be made interesting through skillful paneling, in which case the proportion of areas adds a note of interesting variety; through checking, which makes for vibration; and through gradation.

Vibration. The term vibration as used throughout refers to the effect of slight fluctuations in light and color which are due to shifting

muscular movements of the eye. Granular surfaces, woven surfaces, stipple, very small checks present an interplay of two or more colors the effect of which is referred to as vibrating.

Balance of Color with Grays. Although schemes in gray balance as quiet light, (since the grays are theoretically mixtures of the hues contained in light) and a balanced stimulation of the retinal area may therefore be counted on, a design in grays will always be enhanced in interest if supplemented by a positive hue. The printed page and some forms of graphic art such as etching are examples of unrelieved grays; but in interiors, dress goods and furniture, the grays supply the broad background of quiet relief for the more effective spotting of the centers of interest which are in color.

What colors would go best with grays, cool colors, or warm colors; advancing colors or receding colors? As the grays in their lack of hue are neutral, that is, neither warm nor cold, and as they tend moreover in their quiet and lack of contrast to be retiring or receding, it would seem that except for special effects, warm advancing colors would serve to offset their passivity and coolness and tend to add gaiety and force to the scheme. A slight preponderance in favor of warmth in a color scheme is generally desirable, even though the aim of the effect as a whole is a refreshing coolness.

Are Harmonies in One Color Possible? Self-

Tones. How can one secure a color scheme based upon a single hue? Can a design be built on yellows and yet avoid the monotony of a dead uniformity? Is there any opportunity for variety within a single color? If it is all yellow, there will of course be no variety in hue. But there may be variety of value and of intensity which would carry with it variety of warmth and activity. In other words a room may be designed in varying tints and shades and intensities of yellow.

Variations of one hue are spoken as "self-tones." A color scheme built upon self-tones closely related in values and intensities will resemble schemes of closely related grays, and all that was said concerning grays will apply equally here.

Rhythm and Balance in Self-Tones. Textures. Self-tones may receive the same types of treatment as grays; (a) paneling or striping, its most popular forms as in sleeping-room wall-papers; (b) checking as in textiles or tiles; (c) gradation which is sometimes added to striping. The most interesting effects in self tones are quite often like the gradation of grays on the page margin or wall, effects not premeditated, but growing out of the character of texture and weave. Thus much of the beauty of satin in the one color arises from the interesting variations upon that color which occur through its manner of reflecting light; at some planes throwing it off like a mirror, bright

and full of sheen; at others producing quieter values or duller tones. The matter of texture is thus seen to be a very important element in color harmony and design, since certain textures seem even in the flat to provide endless variety and interest while others like cheap cloth and burlap seem to demand the application of a formal color pattern or weave to atone for their lack of variety. Reversing and placing goods which has a grain or weave that catches light so that the light is caught at different angles creates most fascinating effects in self-tones. Parquetry is an instance of this principle applied to wood.

Danger of Self-Tones. In a scheme of self-tones, it is generally best to separate two light values by a dark one and two dark values by a light one. A pure yellow and a grayed yellow, whether tint or shade, may clash; particularly when the contrast in value is weak. For the pure yellow, far from gaining from the grayed yellow, may be dulled; the grayed yellow far from gaining by contrast with the pure yellow may seem either chalky if it is a tint, or muddy and too dull, if it is a shade. A third color complementary to the two or black, white, light or dark gray, would be necessary to separate them.

Although self-tones of any color and a scheme of grays resemble one another in character, in that there is no contrast of hues in either case, self tones are less self sufficient as a color scheme, than are grays. For as we have observed in the case

of printing and etching, grays may be complete as a harmony without the addition of color. But a design of self-tones never can be quite complete; without counting upon adjacent color to supplement it. For in a room, planned upon four self tones of blue A B C D, these strike a balance B—C. The eye may be over stimulated by this large area of B—C blue. This unpleasant overstimulation of blue can be neutralized by the introduction into the scheme of its complementary yellow in the accessories or trimmings.

Two-Color Schemes Built on Complementaries. Where the intention is to create a two-color scheme which may be more or less complete in itself complementary colors will quite naturally be the ones to employ. For these are balanced in retinal stimulation.

But here the difficulties of analogous schemes are greater than in self-tones or neutral grays. For how is one to avoid the prominence of contrasting elements in any two complementaries? Complementaries as we have seen contrast in hue, in warmth, in activity and in value. How then can an analogous harmony, one in which the accent is on likeness rather than on variety, be obtained with complementaries as a starting-point.

A room is to be designed in blue and yellow. Blue in its spectrum quality is relatively low in value, cold, receding; yellow is high in value, warm, advancing. There are reasons why blue and yellow should be used. There are also rea-

sons in a particular case for greatly reducing this contrast so that though blue and yellow are used the harmony is one of analogy.

Yellow can be made to lose its power and contrasting character by an attack upon its warmth and value and consequently upon its activity, or the attack can be made upon the properties of the blue or, finally, both can be modified. This attack can be made in a number of ways.

1. Add black to yellow by admixture.
2. Add white to blue by admixture.

} Bringing them together in value.

3. Add blue to yellow by admixture.
4. Add yellow to blue by admixture.

} Graying each and bringing them together in hue and value.

5. Break up blue with spotting of yellow.
6. Break up yellow with spotting of blue.

} Same effect as 3 and 4.

Black or blue added to the yellow as in (1) and (3) would reduce its qualities and bring it closer to the blue in value warmth and activity. But assume that pure yellow and pure blue were the only means to be employed. How could that yellow nevertheless be grayed and the contrasts reduced. This could be accomplished as in (6) by the introduction of blue spotting over the large yellow areas, as in the case of a yellow couch cover broken up and darkened by the blue cushions thrown across its surface.

The contrasts in a two color scheme may be reduced by acting upon either of the two colors.

Thus instead of reducing the warmth and activity of the yellow we might heighten the activity and lessen the coolness of the blue either by adding yellow or white to it, as in (2) and (4) or by breaking it up with yellow or white spotting as in (5).

Rivalry in Two Color Schemes. Where two colors are used, each to cover a large and distinct area, there is always the danger of a disruptive rivalry between the two, each making a separate clamorous bid for attention.

The larger the areas so treated the more will the separation and lack of unity annoy. It would be offensive even in a small room rug. Imagine this juxtaposition of two complementaries applied to the whole side wall of a building. The larger the scale the more need of pulling the two areas together. To lessen the contrast of these two areas, by heightening two or darkening one, will not be sufficient to overcome the rivalry. The method for introducing unity into such a design is the broken color technique. This is illustrated in the rug which although composed of two colors has these colors so distributed that the whole area vibrates with a play of both.

Two Colors. Related or Neighboring Hues. The simplest type of analogous harmony in two colors is one based on two neighboring hues. Thus blue and blue-green, yellow and yellow-orange, blue and blue-violet would, if the contrast in value and intensity were moderate, be examples of analogous harmonies. But such schemes are

likely to be very poor except in relation to some third color. In most such cases the colors are both warm or both cold, and present insufficient contrast in hue to be pleasing. Over-large areas of two such hues are as a result likely to be as incomplete in a balance of retinal stimulation as one color. The eye would grow tired of yellow and yellow-orange almost as soon as it would be wearied by yellow alone.

In the case of two hues separated by a somewhat wider interval as blue and green, yellow and orange, orange and red, these colors may clash and be mutually hurtful through simultaneous contrast if close in value and in intensity. But if the contrast of values were increased such schemes may prove fair. Thus violet would go fairly well with blue if its value contrasted sufficiently with that of the blue to avoid muddiness. Similarly blue and green in contrasting values may be fairly pleasing but such schemes will always seem incomplete unless associated with a third color which complements these in warmth or activity. Two neighboring hues unrelieved by a third complementary to the two are somewhat like an unresolved harmony in music.

Two Related Colors and Black. The simplest method for testing the truth of the foregoing is the use of the colored discs. Take any two colors neighboring in hue, both high in value and intensity. Place one behind the other so that the effect is of a wall three-fourths one color and a border of

the other. Observe the lack of clarity in such schemes. They correspond to a sentence the thought of which is vague. Each hue seems to rob the other of something of its quality. Now if a black slip is interposed between the other two so that a narrow edge of black separates the two colors, the effect is immediately changed. The colors become clearer, the scheme more effective and the two colors instead of clashing are likely to be attractive in a quiet sort of way through the subtlety of their difference. A picture, framed with a small black frame, separating a mat of one hue from a related hue or a self-tone in the wall, is a practical application of this type of three color scheme.

It may be set down as a general principle that two related warm colors, light in value, are best enhanced by the introduction of a rich black. This would, however, make the scheme a contrasting one unless the black is kept relatively small in area.

Two Related Colors and White. Two related colors both dark or low in value, whether pure or gray, also require separation as can be demonstrated with the slips. In this case particularly if they are both cold, white can be used to separate them for the sake of clarity and to reduce muddiness. This use of white and black to separate related colors is very important in textile design, where a pattern of one color on a ground related in hue must be outlined in black or white, as the case

may be, to avoid muddiness and lack of clarity.

Complementaries and Black, or White. Two complementary colors closely related in high values, and both grayed like a light gray blue and a light gray yellow although enhancing one another, may nevertheless be somewhat weak along their edge, unless here too a contrasting note of black is introduced to separate them. The experiment can be made with the slips and the effects noted. If both are low in value, an edging of white becomes desirable.

Related Colors for Details in Larger Schemes. Schemes of two or more colors all related would be attractive in a couch cover, portière, picture or other surface which would be part of a still larger scheme in which the contrast of the complementary would enter. Yellow, yellow-orange and orange in a portière or a window curtain may be very good when the room itself is cool and complementary.

Three Color Schemes. Complementary and Related. In a scheme of three or more colors, even in a detail such as a portière, it is generally advisable to have two or more of the colors in the portières related in hue and to have one complementary. This complementary note has an enhancing effect on the two related colors and is also useful when the wall is complementary to the body of the portière, because it introduces a common note.

Analogous Harmonies and Interest. In the chapter on harmony it was pointed out that con-

trast and variety are prime aids to interest. Analogous harmony tending towards the reducing of contrasts of hue, value and intensity is therefore in danger of failing to hold attention.

In many cases of advertising the designer faces a dilemna. A design harmonizing with the associations of the goods to be exploited may be too gray and subtle to hold attention. A design strong in its contrasts and aimed to attract attention may be incongruous in its force. The solution which is considered more in detail under the heading of color in business, lies in selecting an analogous scheme, which though restrained in contrasts still has novelty in the combination or in the arrangement of the hues to give them attention-holding power.

CHAPTER XVI

THE LAWS OF FITNESS IN HARMONY

Practical Considerations in Color Planning. A general study of the laws of fitness will help to an understanding of the conditions which the designer must remember and recognize in practicing his art.

The study of harmony can be made on a purely mathematical basis, without reference to specific conditions, and solely with regard to rhythm, balance, proportion and retinal stimulation. But to study it in this manner is like working out a mathematically correct economic scheme, and leaving out the human element. Color does not exist in vacuo; it is constantly and definitely related to practical problems, and its character must be influenced by special considerations in each case.

Fitness in Structural Design. The difference between a theoretical study of harmony and a practical one may best be illustrated by an example taken from structural design. A student about to make a chair may have been taught about the need of rhythm of lines and planes, the grace which comes from a feeling of related motion in the parts. He may have been taught balance; that

the upper part should balance the lower part in interest through the addition of carving or some similar device. He may have been taught proportion; the value of a unit of measure and an agreeable variety of measure, within a design. But before he can make a good chair, that rhythm, balance and proportion will have to be controlled by a sense of the fitness of the chair to its purpose, to its material and to the construction which the material enforces. The character of his rhythmic lines will be one kind if the chair is to be a babe's high chair, of another kind if an invalid chair, of still another if a dining-room chair.

The proportions likewise would be modified by considerations of use. In like manner the material, involving as it does different construction, would completely modify the application of the pure principles of harmony. The Vienna chair, the rattan chair, the upholstered chair, each would help determine the design through the character of construction which the material makes necessary.

The Laws of Fitness. These principles of adaptation to use, material and construction which the structural designer must consider in order to make his design not only abstractly beautiful, but actually beautiful in its practicability are called the Principles of Fitness.

In color problems the practical considerations naturally vary in each case but they may be classified under the same three headings, viz.:

1. Fitness to Purpose or Use.
2. Fitness to Material.
3. Fitness to Construction and Shape.

If these three principles are once fully realized in their general meaning their special application to color problems will be more readily appreciated.

Fitness to Purpose or Use in Design. No matter how agreeable the lines, shapes, proportions or colors of an object may be, it is in poor taste if it is not so fashioned that it both fits and expresses its purpose. No matter how agreeable may be the ornament to be applied to an object, if it interferes in any way with its usefulness, it is poor design. The chair must support. The knife-handle must be easily grasped. A paper-cutter may have an embossed handle, because no pressure will be put upon it; a carving-knife on the other hand must be strongly made and simple of handle. Naturalistic carving of roses on the back of one's chair would endanger waists and create discomfort. Necklaces must not be too heavy. A shoe is not beautiful, no matter how abstractly attractive in pattern, if it suggests discomfort.

The Fitness of Color to Purpose. This principle of fitness to use applies to color in many ways. Color should not be loud or gay on objects of common use such as cooking utensils, not only because gay colors would be unsuited to their function, but also because use would blacken

them. Colors may be attractive and rich in the case of the more purely ornamental objects such as vases, jewelry and ties.

Colors must have quiet dignity in large objects combining use and beauty such as pianos. Color should be soft and receding where objects are to keep their place as in stone walls, gates, fences and similar unobtrusive objects.

Colors should be strong and contrasting when meant to be seen at a distance; quiet and subtle when to be seen at close range.

In a hospital, in a music room, in a gymnasium, in a classroom; in an afternoon street dress, in a morning wrap, an evening gown, a bathing suit; in fine, in every practical problem, color is modified by considerations of the use or purpose of the object to which it is applied.

Fitness to Material in Design. Limitations of Technique. As a general principle in the arts of design, whether the designing of ornament or of objects, the material employed modifies the character of the pattern. A wooden chair has four legs. A marble bench would look ridiculous if constructed with posts. A design in inlay for the back of the wooden chair would have to be made with the limitations of wood inlay in mind and effects proper to wood-carving would not be attempted. Lace filigree is not proper to stone carving. The attempt at strong relief and modeling is hardly justified in lace work. All of which may seem platitudinous; yet the world is filled

with so called "Objets d'art" designed in violation of these principles.

Fitness to Material. Regard for Texture. In the foregoing the references have been to the limitations of technique imposed by the material. But there is another consideration under adaptation to material. The essential beauty or quality of material, whether wood, marble, silver, gold, or satin, should be enhanced rather than minimized by the design. The strength and graining of wood, the mass and bulk of marble, the luster of silver and gold, the sheen of satin should be intensified and made more effective by the treatment. Marble in the rough is impressive in bulk, attractive in texture. A statue which in its aim at copying life loses the qualities of the marble itself would be a poor statue.

The Fitness of Color to Material. This principle of preserving the character of a material has an interesting corollary. The richer and more attractive the material the less may it be hidden or lose its character. Sculptors do not as a rule paint ornament over their bronze or marble, hiding the textures of the surface. For the same reason good designers in textiles will not put much ornament upon satins, velvets or fine leather bindings. Where the ornament does not enhance, it has no reason for being. On the other hand, cheap materials such as linen book covers, burlapped screens, poor wood furniture, scrim curtains, will be more elaborately treated with applied

color unless fitness to purpose dictates little ornament.

We may apply the general principle of adaptation to material to the art of coloring in a number of interesting ways. The deliberate disguising of material by color, the attempt to make wood or plaster seem like marble; inexpensive metals like precious ones; wood of coarse grain like superior wood, all this is cheap and in poor taste. Most inexpensive materials can be made more attractive by a frank use of color than by an obvious attempt to deceive. Moreover whatever the texture and color of the material, provided they are not sufficiently attractive in themselves, a judicious use of color staining or of color ornament, may bring out fine points or may deliberately surrender the texture for the pleasure afforded by the applied color. This is illustrated in the painting of wood.

The more beautiful the material in texture and in color, the less the need for dyeing or for color ornament. Where neither the texture nor the body color are interesting, staining, dyeing or painting the whole surface may overcome the weakness. Where the texture is interesting and its color is only moderately so, the use of ornament in a well chosen complementary color may give quality to the initial color.

Leather bindings, when the leather is exquisite in quality should be chastely ornamented. Linen or cheap cloth bindings, may require all the blan-

dishments of color to overcome their lack of appeal.

Men who for the most part know little about textiles frequently remark upon the simplicity of taste of some very wealthy women, and comment upon the fact that they seem to spend less on their clothes than do their less opulent sisters. Apart from the expense of the cut and the design, there is quite frequently a high cost to the goods itself, which with all its apparent simplicity is really a material of costly texture.

Soft clinging materials, and rich materials of pleasant vibrating sheen, may be of solid colors with little trimming. In the case of soft fabrics, the gradation of the one hue as it falls in folds of different values will create even without applied color a varied color appeal.

Fitness to Construction in Design. The ornament or pattern of the structure itself must not hinder the constructive strength; they should if possible even accentuate and in some cases help constructive strength.

In making a chair there are certain definite constructive elements which must enter. There must be supports, there must be a seat, there must be a back. The supports must function adequately with reference to the weight, and, what is more, they must look adequate. If they seem insufficient, no matter how agreeable in line, there is a discord between appearance and use. There must be more than the abstract unity of inner rela-

tions. The seat should be at the height dictated by man's figure and not solely as dictated by a mathematical scheme of proportion. The back must slant so as to support the resting sitter most comfortably. Ornament which would make the supports seem purely decorative adjuncts and so destroy the feeling of their supporting power would be in poor taste. Carving on the seat of the chair would be ridiculous. A back so delicately filigreed as to seem unsafe to lean against, or so elaborated carved in strong relief that it would be torture to rest against it, would be a poorly designed back, no matter how independently agreeable the ornament might be.

Here all that has been pointed out is the need of avoiding ornament which will definitely hurt the sense of structure in the object. There are cases though, where ornament may positively help structural strength. In the bands of ornament around a vase, the thickening serves in the older pottery to strengthen the vase at its weakest points, just as the extra thickness of the flower pot strengthens that humble vessel.

Fitness of Color to Construction. It may seem that the colorist using color as a purely decorative feature of life need not be concerned about such vulgar things as mechanics and construction. But when we remember, as has been more fully worked out elsewhere, that color may be flippant or stately, brilliantly exuberant or extremely sober and reticent, we can see instantly that the mood of

color must be in harmony with the construction. Supporting masses such as table posts with jobs to perform should receive sober color treatment. Interior walls will be grayer in small rooms than in larger ones. The color note on a purse will be at the clasp to accentuate its function. A fur border at the base of an evening wrap will have weight in color through a strong contrast which pulls the eye downwards thus emphasizing its function. Color on the low wall will be placed in vertical bands to carry the eye upward, to help give height to the room and support to the ceiling. But if the room is too high it might be applied in horizontal bands to create the illusion of reduced height.

Fitness or Congruity, Part of Color Harmony. All these instances of the laws of fitness are given in order that as the practical problems of everyday life are approached the colorist will have the complete conception of the nature of color harmony to guide him. Color must satisfy the retina through complementarism and simultaneous contrast. It should satisfy the mind in its orderly arrangement as regards rhythm, balance and proportion. It must also satisfy the mind as regards its fitness to the practical conditions inherent in the character of the object to be colored.

CHAPTER XVII

COLOR-MUSIC AND COLOR-MOODS

Rimington and His Color Organ. There are experimenters who have been interested in a scientifically established analogy between painting and music and who have endeavored to create a definite art of color-music built upon that analogy. The chief among these is Rimington who built a device which might be called a color organ. This instrument has notes, controlled by stops which, when played, project colors upon a screen.

For this instrument he writes color compositions, holding recitals at which the audience watches a color symphony, color poem, color drama, or call it what you will, played upon this screen in sequence of time, like music, as well as in sequence of space like painting.

Music with Color Accompaniment. In New York at the Russian Symphony concerts, a similar instrument has performed on two occasions, not as an independent art but in connection with musical numbers. The author found himself at one of these performances attempting to force analogies and correspondences between the tones of the music and the color; a fairly interesting exercise

but rather tiring. The fatigue resulted from the fault known in design as rivalry. Some such combination of changing colored lights and music may yet be evolved, but what may prove the more likely method is the one employed in moving-picture theaters of the type of the Strand and the Rialto in New York, in which the whole house is flooded with lights of different colors. These the operator controls on the basis, no doubt, of some faith in the correspondence between his changing colors and the changing moods of the music. If people are to keep their eyes open at concerts, music would profit by a greater measure of harmony and color quality in the setting. A music room, a concert hall, and more particularly, a concert stage are worthy of more pleasing color treatment than is usually accorded them. Concerts should either be played in a light so subdued that only the ear is appealed to or with colored lights and with colored settings harmonious with the spirit of the music.

"E" in Music. "Pearly Blue and Shimmer of Moonshine." But when Rimington composes a color scale on the analogy of the musical scale, giving to his colors a similar sequence, and when Scriabin writes in his score of "Prometheus" the "luce" part for the "Clavier à Lumières," their compositions are based presumably upon a psychologically demonstrated relation or a mathematical one between the art of music and the art of color. In Scriabin's case the assumption must be that given colors absolutely harmonize with, and

help sustain or are sustained by given tones of sound. Though neither of these experimenters in color music gives either psychological or physical bases for their decisions, they arrive at color-codes the nature of which may be judged from the following which Luckiesh points out. In Rimington, C is deep red. In Scriabin it is violet. E is yellow in Rimington, it is "pearly blue and shimmer of moonshine" in Scriabin.

Differences between Color and Music. One difference between music and painting is that one is composed in space where the whole effect may impinge almost simultaneously, whereas the other is composed in time. Painting can imitate lines, forms, textures, and colors and thus attain a high degree of representative precision in addition to its æsthetic appeal as pattern. Music can suggest lines, forms, textures, and colors but without that absolute clarity which is possible to painting. Color music proposes to give up the clarity of representative painting for the sake of attaining the dynamic quality of music, the quality of pattern through time as well as space.

The Musical Expressiveness of Color. Interesting as the experiments along this line may be, much more interesting and almost universally applicable is the thought which underlies all attempts at a musical expressiveness in color. All these experiments are based upon the belief that color has a function other than the representative; that it is also emotionally suggestive and expressive.

Can color suggest sadness, frivolity, stateliness, tenderness, austerity? Can it be martial like drums, stimulating like trumpet-calls, tenderly plaintive like the violin? Can it be so composed as to combine a quiet, deep obligato with a treble melody, as is possible in the piano? Are there in color tones the equivalent of soprano trills, tenor tones and basso chords?

Color Audition and Color Analogies. There are cases of people who hear certain tones on looking at certain colors, and vice versa. These seem to have strong associations; so that given sounds not only stimulate the center of hearing but arouse instantaneous associations with visual memories. Nordau castigates all those poets, painters, and musicians who even in analogy speak of dark tones in music, or shrill colors in painting. He calls such people degenerate and mad. At the risk of being "committed" by Nordau, we may approach the question of musical analogy with open mind. Or rather, let us quite forget about music, and considering color by itself see whether it has not the capacity for suggesting emotions.

Earlier Attempts to Define Color Moods. Much has been written on the emotional suggestion of color from the days of Greece to the most recent study, "The Language of Color" by Luckiesh, but in all of this writing, including Goethe's famous statement of color moods, the elements of value and intensity were virtually ignored. This is a strange oversight and it seems to the author that

it reveals a fundamental misapprehension. Important as may be the difference between blue as such and yellow as such, the difference between light and dark is very important in the emotional suggestion of color. As it is almost in the very nature of all organic life to reach towards light and the sun, it is quite likely that the emotional associations of colors are to be explained in large measure on their kinship with light and the sun, or with darkness and night.

The Emotional Associations of Light and Dark. To this very day the first emotional reaction to color in which everybody from primitive savage and child to the healthy unsophisticated man or woman, boy or girl of to-day would share, is on a basis of light and dark. For from childhood on, our associations with darkness were fear and mystery. The unknown spirits, goblins and specters wait for night and must fly before the dawn. The quickest way to create a state of receptivity for suggestions of fear, the unknown, the gruesome, the horrible, the mysterious, the uncanny is to turn out the lights. The Witch scene, the Ghost scene, the Murder of the King in *Macbeth,* are night scenes, as are most scenes of terror in literature and drama. The fitful lights, the dark long shadows, the empty caverns of darkness, the contours so strangely silent and oppressive when sharply silhouetted; so elusive, phantomlike and weird when but dimly felt, all play upon the imagination.

Light dispels shadows, glooms, darkness, the unknown fears and brings back to the world its accustomed shapes, its familiar, friendly colors. Light is the sun, warmth, clarity. Hope and courage enter the heart, so recently chilled by darkness. Hell's dark pit is lit by fitful flames; heaven is a realm of purest, whitest light. Mystics there are, dreaming spirits who dislike light with its clarity, sharp edginess, and insistent materialism, and who prefer mists and dim, subdued lights. But even these do not worship blackness.

It can be seen that if the first distinction in color-mood was just light and dark, with light suggestive of good and darkness of evil, in time there would develop a form of color-symbolism. Yellow becomes associated with the heat and virtue of the sun; blue is associated with the sky and certain virtues of goodness are ascribed to it, while green typifies the fecundity and restfulness of the earth's broad surface.

Color Moods through Descriptive Associations. Later the poets employ color to suggest mood in narrative verse, not so much as embroidery for the landscape setting as for its power of characterization. "Dark men," "fair women," "wan," "pale," "bloodless," "tawny," "nut-brown," "flushed," "green with envy," "black with rage."

In connection with landscape, the colors of earlier poetry are blue, yellow, green, black, red; the primary colors and one or two others. These

are employed without tints or shades, such as light green meadows, dark blue skies and without compounding such as yellow-green, blue-violet, orange-red, and with rarely a secondary. For in European poetry, ancient as well as mediæval, the landscape was only a stage setting and so was only very broadly sketched in, without that wealth of detailed color which figures in later romantic verse.

> "Behold the dawn in russet mantle clad
> Walk o'er the dew of yon high eastern hill,"

is a splendid and beautiful example of Shakespeare's landscape color. In the earlier poetic attitude towards nature, sunlight was the time of brave adventure, a light-filled world in which the joyous heart moved. Moonlight was the time of tender longing. Dark night was the period of foul deeds and dungeons. Neither dawn, daylight, moonlight nor dark night were really visualized in the variety and subtlety of their color tones, or of their atmospheric effects. These first enter poetry after the painter, whose language is color, had discovered and recorded them.

Now, this digression concerning color in poetry and religion demonstrates that colors seem to have their emotional quality largely as a result of associations, just as musical tones do. The musical phrases expressive of grief are suggested by some association; either by sobs, shrieks and wailing tones, by the low plaintive sighing of trees

in a wind, or by the dull, monotonous rhythms of waves upon a deserted beach. Some association either in man's tones or nature's furnishes the color designer with his notes and chords, just as it does the musician and poet. Some associations in the experience either of the individual or of the race may give to a color or a color combination something of its power to please or to irritate.

Inherent Powers of Colors. Varying Retinal Appeal. But though color emotion is largely associational and yellow is flaming hot, brave and stirring, because of the association of the sun, it cannot be denied that yellow, through its activity and its advancing character, has an inherent stir quite independent of association. Little, yellow-spotted trimmings on a blue ground will look joyous through the quality of contrast but there is besides some inherent difference in the character of its stimulation; a purely physical and physiological difference. That this is so is quite obvious in the case of the marked effect of red not only on many people but even on animals.

Let us consider the color attributes and first see what expressiveness these have either inherently because of their physical nature or through association with sunlight and night, or with other categories.

The Moods of the Hues. Have the hues as such any emotional suggestion as found in their fullest or spectrum intensities and values? It will be recalled that in the spectrum the hues range

from high-light yellow to low dark black. So that any difference in spectrum hues may at the same time be a difference in the emotional suggestion of the value or degree of light and dark. In other words, violet if it is gloomier or more austere than yellow, may be so largely through the fact that it is generally thought of in its lower value and so partakes of that primitive depressing effect of darkness as such, as compared with sunlight or light as such.

Spectrum Colors and Associations Suggested to the Author.

Yellow: Shrill, warm, gay, joyous, active, stimulating, light.
Orange: Mellow, warm, rich, full-bodied, luscious.
Red: Intense, hot, active, vital, exciting, fierce.
Green: Passive, cool, refreshing, restful, quiet, retiring.
Blue: Passive, cold, depressing, aloof, unless outdoors where it suggests spacious expansiveness.
Violet: Aloof, dark, cold, austere, pompous, ceremonial, grave.
Yellow-Green: Gentle, stimulating, flush of warmth, spring.

Values and Emotional Suggestion. Darkness and Mystery. Any given color, run through the scale of its values, will range from the lightest and most stimulating note within the possibilites of its character to dark and more forbidding phases. Thus, even yellow in the darker values verging on black, becomes gloomy; and violet in the lighter values verging on white may become agreeably

stimulating; blue, in spite of its coldness, may be shrill and almost joyous. Red becomes quite sombre in its deeper tones and almost gloomy when it nears black. Dark-brown taste is the expression people have for a particularly depressing state of feeling.

Intensities and Emotional Suggestion. What change in emotional suggestion does a color undergo as it varies from its purest intensities through its reduced intensities to gray?

Gray as such, in its lack of intensity or hue, varies from light to dark. It is associated in the lighter values with sophisticated moods, refinements, and subtleties. In the darker values it is mysterious.

A pure color grayed loses something of its quality and approaches the sophistication, refinement and subtlety, even the mystery of gray. Thus, yellow slightly grayed is less active, less intense, less joyous; it is milder and still stimulating if only moderately grayed; but wan and strangely faded if more positively grayed. It would appear then that dulled color has a slightly wan, tired, spectral, subtle appearance and suggests sophistication as against the primitive freshness of even the dark, intensely pure colors.

CHAPTER XVIII

COLOR ILLUMINATION

The "Gay White Way" a Symbol. The mechanics, physics and chemistry of electrical illumination, or of artificial light generally, are quite naturally not within the scope of a volume like this. But though the manner of obtaining artificial illumination may well be left to the experts, there are problems in colored illumination which face the home builder, the electric sign display firm, the store-keeper in his show window and interior lighting, indeed the city itself. Colored illumination is a subject all the more interesting because although it is only in its infancy, it gives every promise of transforming the surface aspect of life in the decades to come.

The "Gay White Way" is in a sense a symbol of the attraction which powerful illumination has for the mind. The restaurants, cafés, saloons and theaters use the appeal of the brilliant arc-lamps, the twinkling electric signs, the sparkling display lights. Under stress of competition new novelties are evolved and a warmer and richer glamor of colored light envelops the principal thoroughfares of business and amusement.

Artificial Daylight. As the eye is normally accustomed to light which has a solar spectrum, in other words to daylight, it is possibly best adjusted to such light. The tendency in the study of illuminants has therefore been toward the perfection of artificial light of daylight quality. Just as dye stuffs were in many cases discovered through the character of their spectra, in which one color or another predominates, so illuminants were searched for which would give a complete spectrum of daylight quality. As such illuminants however show a disproportion in the hues, as compared with the solar spectrum, color screens are used to modify the resulting light so that a closer approach to the quality of daylight may result.

As Luckiesh in his work "Color, Its Applications" points out, white artificial light is disliked and complained of as cold. The explanation he offers is simply that the mind rather prefers a change. But it is likely also that as the color of night or interiors, is bluish or cold gray, the light of an illuminant is more satisfactory, if it is warm and complementary to the blue of the night or the grays of a dark interior.

Artistic Applications of Electric Illumination in Color. In his book Luckiesh gives two examples of actual applications of colored illumination which may interest the reader. To quote in full:

"A suitable use of colored illuminants is found in the Alleghany County Soldiers' Memorial. In

this splendidly lighted installation, which was designed by Basset Jones, mercury arc lamps, tungsten incandescent lamps, Morse tubes, and yellow flaming arcs were used. The ceiling of the auditorium, which is sixty feet above the floor is composed largely of glass in decorative panels. The central panel is outlined by means of the pinkish Morse carbon dioxide tube. Over the corner panels yellow flame arcs are hung, and their flicker adds charm to the colored ceiling which would not be present with perfectly steady light sources. The outer panels are lighted by the bluish light of mercury arc lamps, and tungsten lamps shed their light upon the ceiling, adding a touch of brilliancy. The contrasting of colors is so harmoniously accomplished that the result is exceedingly artistic. Thus the beauty of this monument of decorative art is visible at night as well as by daylight, which is too often not the case. There are many other interesting applications of color which make this beautiful work of art a mecca for those interested in color lighting.

"A rather interesting case is found in a dining-room of a pretentious residence. A large oval panel of diffusing glass is set into the ceiling, and behind this a great many red, green and blue lamps of low voltage are placed in the approximate proportion of two red, three green and five blue lamps. The lamps of different colors are controlled by means of dimmers set in the wall, so that by varying the proportion of red, green and blue light

various qualities of light may be obtained and also a large range of intensities."

Artificial Light in the Home. In the chapter on color in the home, the problem of artificial lighting in the home was touched upon in connection with the discussion of ceilings. It was there pointed out that an argument for the atrocious white ceilings was their light-saving quality and that according to some of the bulletins issued by gas companies even wall papers were to be approached from this angle. It seems that most people have a passion for light as such, quite regardless of its quality. They want things clear, distinct, bright. At the twilight hour no matter how interesting the mood of the fading light in the room, with its faces and forms strangely dissolving in the shadows, its deep pools of darkness with here and there a gleam of wan light, most of the company will agree that it is "time for lighting up." Then the test of prosperity and well-being seems to be the strength of the illumination. It can not be too strong or sharp for most people. And so bulbs of higher and higher power are introduced.

More recently a reaction has set in. People interested in the home are beginning to observe that mere light as such may be quite unpleasant at night, that artificial light no matter how white, is not daylight. It glares, it is cold, it is trying on the eyes. Many are learning to recognize that the stronger the light is, the harder are the shadows

which it throws, and the more unpleasant its effect on the complexions illumined, which it tends to blanch. So the lamp shade is called upon to tone and modify the strength and whiteness of the light which it took decades to develop.

This is not the place for a discussion of electric fixtures and their weaknesses of design and construction. What concerns us here is the color of the artificial light. In a previous paragraph an elaborate arrangement for illuminating a dining room was described. Miss Irwin in her book "The New Science of Color" looks ahead to the time when similar ideas with many ingenious variations will be quite generally applied, and effects surpassing present day stage illumination will be a feature of home building.

But within the more modest limits of the home builder of average means, the lamp shade must at present serve to cast the colored glow into the light of the room. Cool lights, blues or greens, may appeal to some people, but they are usually quite disagreeable in their effect upon the complexion. The vaudeville actor who wishes to impersonate a drug addict, or to tell a mystery story, has the blue or green spot-light thrown upon his face. The preference for warm tones had best be recognized in selecting lamp shades, and even the desire for novelty of effect should be restrained and carefully considered before deciding upon a scheme in which cold lamp shades are employed as the dominant color note. Pale yellow, rose,

even soft orange, are very kind to the complexions in a room, but pure orange, or reds, unbroken by pattern tend to outshine the faces, so that instead of seeing faces beautifully illuminated by lamps, one sees lamps with which curiously unfamiliar faces are vainly competing.

Colored Lighting in Business. Restaurateurs and their decorators can well see the application of the above to their business. While it may be desirable to cater to the taste for brilliance as such, a quality of mellowness and warmth in the light is quite worth while. The use of individual lamps and shades at each table is quite generally recognized as a useful adjunct, because no matter how brilliant the general light, the separate lamp shades can serve to throw a reflected warm glow into the features of the diners which is quite grateful to the eyes. Restaurateurs would no doubt find it worth while to employ schemes of colored lighting which combine novelty with charm. When once the art of colored lighting is perfected, such schemes will be capable of sufficient change to maintain a continued interest in the place.

For this purpose lanterns are useful, and as they permit of different groupings, the element of change can be introduced by their use with comparative ease. The possibilities of effects from lanterns, not merely the accepted Japanese lanterns but a great variety of other kinds which can be devised, have received but slight consideration.

In business interiors at day there may in many cases be good reason for attaining if possible the white light of day by a system of indirect lighting which hides itself, so that all consciousness of anything but daylight is lost. But in such cases great care must be exercised to avoid coldness, and it becomes the more desirable that the walls and accessories be warm and cheerful in tone.

In show windows colored illumination may prove quite an asset. A New York Fifth Avenue shop came into prominence by maintaining the only decidedly colored illumination on the Avenue. It was a powerful yellow touched with orange which, without showing its origin, flooded the window and projected its glow into the street. It could be clearly seen for blocks and blocks. Some time later the color was changed to an orange rose, still quite soft in spite of its purity, because of its indirectness and consequent freedom from glare. Its effectiveness can not be questioned. If it be granted that a show window is in a sense a silent selling agent, working either at one hundred per cent or at greatly reduced efficiency the importance of any scheme of color which can help to fix attention, can be quite readily realized.

Another window which attracted the writer because of the use of colored illumination was a restaurant on a side street. Here the show window was lighted in the usual manner, with an interesting variation. The electric light was filtered

through a panel of draped cretonne with a vague flower pattern of orange, brown rose and yellow green tones. The result was appealing beyond description. It was an absolutely new sensation; quite different from stained glass, painting, lantern effects or lamp shade light. Cretonnes are used for lamp shades but these rarely appear as effective as did the window described in which a rich panel of warm vibrating light was seen through the dark blue street.

Illumination in Streets. The problem of street illumination is one which deserves most careful thought. The division between engineering efficiency and æsthetic requirements is too sharply drawn, and quite unnecessarily so. The old-fashioned engineer who was first and last an engineer, considering efficiency and only efficiency in his structural work must give way to the "modern" engineer trained to consider the achievement of beauty as part of his problem. So too the old-fashioned electrical engineer must make way for the new æsthetic electrician, prepared to consider his problem from more aspects than sheer whiteness or brilliance.

The streets of American cities as lighted at present are cold and glaring. The arc lights are most of them disagreeable and annoying centers of retinal irritation. Not only from the standpoint of retinal pleasure but even from the standpoint of efficiency the white arc light is bad, in that the retina is so overstimulated by its activity that

the prickly piercing pin points of glaring light focus attention, leaving surrounding forms darker for the sharp contrast.

Highly desirable though impracticable except possibly on thoroughfares where there are no residences above the store level, would be indirect lighting, obtainable by throwing light upon the buildings, from which it would be reflected back upon the street. The lights themselves could be hidden from view. More practical but requiring study would be the mellowing of the present lights so that they would be not only warm tinted, but somewhat more diffuse and soft in dispersion.

On the occasion of the reception of the various foreign commissions in New York, the Fifth Avenue arc lights were made yellow for miles. The effect was quite pleasing but the lights were not permitted to remain yellow. After the few days of celebration, they were changed to their accustomed white glare, only to be altered to yellow again on the occasion of the next reception. Ignoring the unnecessary trouble and cost of these changes, would it not have been worth while to have maintained the yellow lights throughout the few months in order to determine by a fairly prolonged test the degree of satisfaction which they would give. In any event here is a field in which the engineer with taste as well as ability may make a most interesting and worth while contribution to the beauty of night in the city streets and squares and parks.

Colored Lights in Fountains. On the occasion of the receptions just mentioned, colored illumination was also used in the basins of some of the Fifth Avenue fountains, notably the two in front of the Library Building. The spectacular effect obtained from this source was quite wonderful, and the more ambitious city squares of the future will either regularly or at holiday intervals be eye-stirring pictures, in which the music of the splashing fountains will blend with the dissolving colors playing upon the showers of jewel-like spray. What the sun's play does for a fountain at day, these lights would still more bewitchingly do for fountains at night.

Here too keyboards of simple character could be devised so that varicolored effects could be planned from time to time. There need be no fear of a too insistent theatricalism in these effects, for the softest colored grays could be used as well as the purest and brightest hues.

Colored Searchlights and Clouds of Steam. Still another use of colored lights was demonstrated on the occasion of the Hudson-Fulton Celebration in New York when clouds of steam ascending high into the night sky were played upon by colored search lights. Steam and smoke are in themselves so fascinating in design, color and movement that it might seem that they are quite sufficient and that the added effect of color illumination is an artificial note. But at night and for special holiday celebrations, there is value in

this art of colored steam, not only because of the beautiful effects possible but because of the masses of people who can enjoy them.

Searchlights on Colored Banners. In New York since the war broke out a number of larger buildings, among them Wanamaker's, have arranged a device whereby a flag fluttering in the breeze high up in the night sky is lighted by one or more strong lights. These flags have an endless fascination, like the colored reflections of a sailboat in rippling water. The colors of the flags have a quality way up against the far blue sky which is quite indescribably attractive, and the constant variation in the movement of the stripes, is now slow and serpentine, now snappy and whip-like, now large and ample in rhythm.

Here again is an idea capable of development as people learn to play with colored illumination for the pleasure of the play and the appeal of the varied effects. In planning deliberate expressions in some such terms the very play of the fluttering banners could be controlled and would not have to be dependent upon the caprice of a summer's wind.

Colored Illumination in Trees. The Edison Electric Company coöperating with the city authorities has helped to enliven quite a number of festive occasions by the use of colored lights. By the stringing of colored electric bulbs in trees an interesting effect of glowing fruits and flowers is obtained. The red, green, orange, blue and yellow, filtered as they are by the foliage, sparkle and

gleam with an other-worldliness which is quite remarkably effective, considering how simple is the means.

On occasions they have also used lanterns, hanging a tree so full of them that it was all aglow with light. An orchard or small park so decorated would make a most colorful and imagination-stirring setting for a pageant or carnival.

Colored Electric Signs. Of recent years the electric display signs have shown an increased recognition on the part of their designers of the value of color effects. Brilliance in itself is no longer sufficient. Neither is the large attention-getting factor of motion in the lights. Planned color effects, combining brilliance, motion and color novelty and imagination are now sought.

Just north of the Times Building in New York an electric sign has recently been erected which points the way to what may prove to be one of the arts of the future. The structure for this illuminated "ad" is on a roof-top; it is several stories high and runs the full length of a city street. Though it advertises nothing more æsthetic than a chewing gum, it is flanked by two fountain effects, in which the lights are designed to represent a fountain basin with water spraying up and falling again in jeweled drops. The constant movement and play of the water is well conveyed even to the trickling of some drops down over the basin's edge. Between these two fountains in the large symmetrical pattern are two peacocks the

heads of which meet at the center of the design. The iridescence of their tails is achieved by blues and greens, purples and oranges, which change intermittently as though with the slight rippling of the feathery surface. Very weak in the general scheme is the large amount of crude yellow in a conventional flower border band running the full length of the sign at its base. The other details are negligible for our present purposes.

This may be the beginning of a new art of the skies, in which men of the color talent and fantasy of a Monticelli or a Prendergast will execute in colored bulbs upon a skeleton of iron, imaginative scenes of rippling colors, ladies in brocades and silks and satins, walking beneath autumn groves, while blue seas spotted with white sails gleam in the distance.

CHAPTER XIX

COLOR IN THE THEATRE

Color Suggestion vs. Old-Fashioned Setting. Among the many results of the new interest in color and its conscious use for expression, are the modern ideas regarding color in the theatre. Not only do the new theatres show a greater study of color scheme in the interior decoration as such, but the very stage effects are influenced by the new science of color. The tendency is to give to the stage setting and lighting a more carefully considered part in play producing. The naturalistic painter copied an effect and tried to duplicate a cross-section of nature, color for color and form for form. The modern frequently creates a color pattern derived from the suggestion of that note in nature. In the same way the old-fashioned scenic painter attempted to duplicate some grotto, grove or palace, by setting up the rocks, the trees, the buildings, and the other accessories of the scene. Every effort was made to deceive the eye, which in the nature of things theatrical cannot be deceived. The elaborate,

mechanically creaking devices for creating the illusion of reality only succeeded in evoking comment, sometimes quite enthusiastic, about "how real it all looks!"

But the skill which is admired in naturalistic stage setting is the skill of a carpenter, a scene painter and a producer alike uninspired by any æsthetic aim or vision. For years one of our leading producers received unstinted praise, because the scene in a mountain lodge was "just like" a mountain lodge; because his Child's Restaurant scene was just like a Child's Restaurant down to the last smash of china. A certain cheap type of phonographic play no doubt requires this cheap type of photographic setting.

The modern producer, however, is beginning to feel that this "realism" fails to bring with it any intensity of reaction, that the audience once it has paid its tribute to the detailed truth has nothing left to stimulate its imagination or to please its eye. The theatre if it is to keep its hold must exploit every one of its resources to the fullest limit of emotional effect. Color is one element in the producer's mood compelling magic box. It must be used consciously to help the effects of the play to carry across the footlights. It must support and sustain the action, harmonizing with it in mood, yet not competing with it through too insistent a note.

Kismet and Sumurun. In the performances of "Kismet" and of "Sumurun," in New York sev-

eral years ago, one had an opportunity to compare the realistic photographic stage with the modern suggestive color setting. Kismet attempted an absolute duplication of a street scene in Cairo; the bodily lifting of the scene from Cairo to an American stage. In Sumurun a palace scene though it was quite obviously conventionalized and simplified had a quality of Orientalism, an exotic richness of color, a suggestion of wanton luxury and riotous splendor which no absolutely photographic reproduction could have equaled. In a number of the scenes this was achieved through relatively inexpensive flat drops which through their color and design made more effective settings for the given action than most elaborate reproductions.

The New Principles and their Exponents. This new attitude towards color is based on the mood-compelling power of color and color lighting. That absolute clarity, definition and literalness are destructive of fantasy and the action of the imagination; that well planned color suggestion whether frankly abstract or deliberately conventionalized, may stimulate the audience to a high pitch of emotional sympathy; these are the foundation principles of the new art of stage setting.

So Gordon Craig, Reinhardt, Urban and Bakst among others have devoted thought to the problems of play producing and have placed an ever-increasing emphasis upon the possibilities of a better use of color effects. In "Ghosts," in

"Hamlet," in a play by Dunsany the setting no matter how flat, simple and inexpensive, if well planned in color and well controlled in lighting, can act as the very mirror of the play's mood, reflecting its every transition by subtle changes.

Color in the Russian Ballet. In the Russian Ballet color plays a large part, not only in the settings, but also in the costumes. The effect of many of the dances is a mad riot of swirling flaming hues. To match the wild abandon of the mood of the more primitive dances the color is as intense in hue, as animated in pattern and as sharply contrasted in values as color can well be. Though color qualities are being used, just as is the music, to support the mood of the dance and its theme, there is lacking in some of the ballets like *Thamar* an obvious restraint and plan. The color like the dancing becomes sheer abandon; expression and emotion seem to destroy form.

But in "Petrouschka" color responds more clearly to the changing moods of the Ballet. The market-place in the holiday scene is gay and clamorous in its intense and contrasted hues. Suddenly the magician, the owner and creator of the three puppets,—the ballerina puppet, the gorgeous Moor puppet who is favored by her, and the clown puppet who loves her,—appears clad in yellow against the purple tent. The restless dancing groups compose themselves, while the little old man plays a tune upon his pipe, a tune as shrill against the wild blare of the music which precedes

it, as is his yellow among the deep oranges, reds, blues, greens and purples.

In the next scene the poor puppet clown whose love is unrequited is revealed in his tent. He is a long thin angularly convulsed streak of yellow and white spots against the blackness of his unlit compartment. The darkness of inner mood in this grotesquely pathetic picture of a mind wracked by jealousy, is suggested by the blackness which envelops him and through which he would seek some avenue of escape. At an occasional climax of torture he throws himself against the darkness, piercing its walls, but only to find more darkness beyond. Suddenly the ballerina appears. She is all allurement, rose glow, cream and pink. The clown Petrouschska is transfixed with joy. More grotesque than ever, he pours out his passion, but as he advances, she steps back out of the door and he is again in darkness.

The Moor is now shown in his compartment, resplendent in costume in a brightly lighted and primitively colored room. He is lying on his couch, playing with a golden ball which he throws into the air and catches. But as he plays, the moving golden ball seems to him to be alive. He drops it. It rolls from him. He makes obeisances and finally falls before it in a passion of trembling fear. The ballerina enters. A love scene follows which is interrupted by the appearance of Petrouschka who is kicked out by the Moor.

In the last scene in the market place again, though the day is dying out, all is merriment and movement. Suddenly the clown appears chased by the Moor who slays him right in the midst of the holiday throng. The sudden change of mood in this climax is conveyed most simply by the color lighting at this point. Poor humanity closes in around the dead clown, the bright colors of their costumes disappear and merge into one black mass.

When the police enter and the magician shows that Petrouschska was only a puppet and that no harm was done, the crowd, still hushed, disperses. As the yellow old man passes across the deserted square, dragging the shell of his broken puppet after him, the spirit of the puppet appears above the tent wall and with menacing gesticulation pours down a curse upon his maker's head. The square is colored with the gray and drab light of disillusion.

In the dramatic development of the Ballet, good color composition in setting, costume and lighting was as much a feature of the producer's task as was the dancing or the grouping. The color as well as the music played a running accompaniment to the mood. And with it all, the properties were inexpensive. Flat drops served for the two tent scenes, and a very simple arrangement suggested all the bizarre outlandishness of the open square.

One of Urban's Color Effects. In the settings for Macbeth by Urban the night walking scene of

Lady Macbeth achieved a high level of purely pictorial effect through the color arrangement. Clad in her white night dress, carrying a lighted candle, Lady Macbeth appeared from the right on an upper level, and silhouetted against a night sky walked slowly across a parapet to a point near the left stage at which steps led down into the court below.

Urban in fact is in part responsible for a recent tendency to make color and pictorial effect the dominant note in the stage. Just as a certain type of spectacular play in the past depended largely upon elaborate mechanical effects to offset the poverty of dramatic material, so in many a modern production the color designer takes the lead over the dramatist.

Musical Revues Saved by Color. New York has for several years seen among its successes musical comedies, with not a single "catchy" melody, not a comic line or situation. These musical comedies, which have been neither musical nor comic, were saved by the stage settings which in many performances brought the only applause of the evening. The amount of pleasure which the eye can derive from beautifully proportioned, beautifully combined colors is demonstrated by the success of these Revues. The eye-filling pictures make them. People who absolutely deny the Picasso idea, who would laugh at the freakishness of one of his abstract paintings, here look at a set representing "Madam Y's

millinery shop'' and though they enjoy the effect, fail to realize that their enjoyment is based upon the mathematically just balance of spacing, of warm and cold colors, advancing and receding, intense and dulled, high and low value hues, combined with interesting contrasts of textures.

Color in a Dunsany Play. Dunsany in his play ''The Queen's Enemies'' seems to have composed his drama with the vision of a painter, and to have realized its action in terms of eye-filling color effects. So richly varied is the appeal of color to the eye in this play that from the entrance of the slave and queen down a stairway to the grotto below the Nile, the bodies of both revealed in every rhythmic sequence of contours through the light thrown upon them by the torch the slave carries, every detail of its action would satisfy an audience which did not understand a word of the dialogue. The illumination of the grotto revealing slaves in waiting, the arrival of the princes, gloriously tawny or richly raimented, the banquet scene with its fruits and viands, its goblets and its wines, the sudden darkening of the grotto as the queen traps her guests, the final horror of the inrushing waters of the Nile, coldly glistening through the blackness of the hole where but a few minutes before all was so richly colorful, these provide a dramatic color symphony quite apart from the text. Whether Dunsany conceived his play in terms of color progression or not, it is the sort of play which lends itself to the modern producer's ideas.

New Ideas in Stage Lighting. But interesting as the new color effects in stage setting and costuming may be, it is in the field of colored illumination that some of the most striking triumphs of future stage production will be achieved. The day of the footlights is gone, the day of the spotlight is going; the stage lighting of the future will be as complete an accompaniment to the mood as the words and action of the play itself. Great skill in indirect lighting, in soft and almost imperceptible transitions, skies which pass from twilight glow to dusk and then to the deep night in which a red moon rises, paling as it ascends, a landscape bathed in evening mists which grow heavier and heavier finally enveloping all in darkness, these are almost the commonplaces of the marvelous new stagecraft.

Experimenters are now working on the perfection of devices for completely controlling the background not only in its intensity of light but also in its hues; not only in its general color but in any part of its color. By availing themselves of the principle that in a stage set the reds, for example, can be made to disappear completely if light which has no red in it is thrown upon the scene, that a given background painted with this type of control in mind can be made to fade out in any part while the stage remains fully lighted, they can attain unprecedented effects. The possibilities of this new stage lighting will be realized if one imagines a Turner landscape of soft volumes of air,

limitless spaces, liquid seas, sun-bathed mountains and light drenched skies, played upon so that mountain and sea and sky can be made to change, by controlling the values, the intensities and even the hues of each part.

There are those who, though they believe in color setting, would use this new instrumentation of the lights to intensify the mood of the play on a definite theory of the relative value of color setting and action. Action is according to them the chief function of the drama. The coloristic effects are secondary and made necessary primarily through the weaknesses of the play as action. Therefore, since color is secondary, it should be so controlled that when the action reaches climaxes of interest, the color fades out, and as soon as the action is on a less absorbing level, the background reappears to maintain a certain level of intensity of effect.

But in the "Queen's Enemies" it was seen that a play might be so constructed that its action could be developed in terms of the lighting. The lighting was not a mere filler-in for poor playwrighting, but one of the vital forces in the action itself.

In the winter of 1917, at the Metropolitan Opera House Madame de Saint Point gave a free exhibition of *Meta chorie,* which is the name she gives to an art of dancing, quite compact and close knit in the body contours, angular and convulsed in rhythms. Whatever may have been the merits or demerits of her dancing as such, she had in her

lighting effect a novel arrangement, which the author would like to see repeated and made the basis for further experiments.

When the curtain rose the stage was seen as one vast blue atmospheric mist. On the right and left, soft hangings seemed to go back for miles through the gradation of hue from a shrill tone through reduced intensities to gray. The back drop was almost completely lost through the foreground atmosphere.

When the dancer appeared in the far background she seemed spectral, so dimly did her form disengage itself from the enveloping gray. As she came forward diagonally, dancing across the intervening space, her body and costumes passed from the spectral gray by subtlest degrees through ever-increasing purity of colored light, to the final climax of a full shrill light in the foreground. The dancing of a single figure in this way became an art of color gradations; for as she danced away towards the background the colors grayed, as she danced forward they grew purer. This effect could be schematically combined with dancing so that the slower, graver and more solemn rhythms would be in the grayer light; the livelier movement in the shriller and purer light. As the dances were given there, this light was always blue—no doubt as complementary background to the color of the dancer's legs and arms,—but graduated changes to other hues might have been combined with the action for given effects.

CHAPTER XX

COLOR IN COMMUNITY PLAY

Grown Ups Playing with Colors. Children play with colors, and kindergarten education is largely based on their delight in bright hues. Grown-ups are not very much different from children in this respect except that they have lost the sense of planned play. Their play consists in sitting back and watching an entertainer. We have seen how color is performing a larger part in the commercialized entertainment provided for adults in the musical comedies, in the dramas, even in the musical overture which is played to color accompaniment in the more pretentious moving picture theaters. The desirability for community play with color used as a means of group expression is to be the subject of this chapter. In an article entitled "Celebrating Independence" written some years ago for the "New Republic" the author gave expression to some of his ideas along this line and as these seem to be apropos at this point, the article is quoted in full.

"Safe and Sane" Fourths. "To grow out of the noise, the bluster and the cant of the old celebrations of the birthday of Liberty is the wish of an ever-growing number. Celebrate,

safely and sanely, the people are told, but what new program is offered? How shall communities express the joy that is in them, assuming that there is any joy? How shall the young ones be made happy and their elders pleasantly reminiscent and proud of their country, its glory and its achievement? Quite simply, it would seem. Let Americanization be the catch-word, and let the people be told by eminent speakers how happy they should be as citizens of this great country. It was once said, 'Let there be light.' These now say, 'Let there be joy,' as though joy could be created by fiat.

An Official Celebration. "The principal official celebration of Independence Day by New York City presented the spectacle of an audience of ten thousand sitting at night in the open air on stone slabs, listening to speeches differing very slightly from the good old spread-eagle variety, singing in unison a hymn entitled 'God Save the President,' words and music contributed by a Maine minister, and being called upon in conclusion to observe 'Miss Columbia and Uncle Sam,' in the persons of two vaudeville performers, dance modern ballroom dances while the new portable searchlight invented by Mr. Edison played upon them. It was an incongruous, inartistic blend of up-to-date advertising and publicity methods with old New England sentiment, interlarded with rhetorical references to our wonderful democracy.

A "Block Party." What is there about this

wonderful democracy which makes our community sense so starved and our attempts at community play so nearly ludicrous or positively pathetic? In Brooklyn on the night of the fourth of July, I came upon a street celebration, one block closed to traffic, gaily festooned with lanterns, a band in the center of the street, crowded sidewalks where Jane, Hans, Pedro and Rebecca with fathers and mothers, little brothers and sisters crowded one another. On the balconies of the frame houses sat families, friends and relatives exchanging small talk. To the eye it was a fairly gay scene with the glowing lights red and gold, orange and amber, against the trembling blue-black of the sky. The faces were like beautiful crystals, each face gleaming with strange and glamorous reflections. But to the mind of the observer and to the spirits of those who wandered aimlessly on the street, what a sorry attempt this was at communal gaiety!

"I stood in front of the bandstand. The rhythm of a popular two-step plainly moved the youthful ones to dancing, but no provision had been made. As the closing bars were sounding another band could be heard from a near-by street. The new music grew louder. March time. Expectancy. At last something was happening. A parade. Those near enough started for the end of the street, but no need. The parade turned the corner. 'It's the Elton Street crowd showing off its bigger band,' remarked a girl as she recog-

nized those in the line. Men and women with infants in their arms, shamefaced couples, rows of hard workers, some few score of children, all straggled by. There were no banners, no torches, no costumes. It was a diversion for both crowds, but evidently a disappointing one.

"But something might yet be in store, for hear! —an announcement from the chairman of the committee. All eyes turned eagerly to the band stand. 'I have the pleasure to introduce Judge X, the speaker of the evening.' Aftr creating suspense by calling upon a member of the committee to unstring some of the lanterns, presumably for a freer play of emotional gesture, the Judge began: 'I wish to congratulate this community on its patriotic spirit and excellent choice of a committee. One hundred and thirty-nine years ago—'

Art Lacking in Celebrations. "Why was it all so sad? What was lacking in this well-meant but abortive attempt of democracy to celebrate its own birthday, a failure typical of so many other attempts throughout the country? To me as I stood there it seemed that what was lacking was art. Whatever little life there was in that street celebration came through its music and its lighting effects. More art, more room for beautiful play and self-expression by the crowd would have meant more life and more joy. Without a common feeling revealing itself in beautiful forms, all gatherings of people tend to be

vulgar, foolish or stupid. To make a community group a social unit inspired, aroused and thrilling to a common emotion requires the presence of a common tradition, instilled and fostered by art forms.

"The Greeks realized this in their drama, in their religious celebrations, even in their athletic contests. The Italian cities reveled in pageants and festivals. The old guilds of artisans had their 'moralities' and their miracle plays. Kings and princes stimulated respect for royalty in the many by exhibitions of imposing pomp and ceremony. But our own democracy, a democracy of mixed races and cultures which so especially needs the common language of art to bind its people in deep feeling, seems not to have realized the need for beautiful forms for self expression.

"Here and there indications of promise and a possible dawning of a democratic art of community play come to us. Pageants and festivals of local color and character begin to mark the holidays of some western communities; but for the most part our group celebrations are deficient in imagination. Committees of 'successful men' arrange the old things in the old way. The cities, overtaxed, make niggardly appropriations, and there is no incentive to self-sustained celebrations by neighborhood groups, when the result anticipated is only a display of lanterns, a band and some dubious oratory.

"When 'the four hundred' plan their gala

nights and costume balls, they act as entertainers as well as entertained, and each costume is in its limited way a form of self-expression. They call on artists to plan tableaux in which a large number of those present are given still further opportunities for acting and playing. But communities rarely call upon the artists to arrange their celebrations. Not that our present day professional artists are always the best suited in the community to serve it in this way. But whether it be the professional artist, using this word in its broadest sense, the amateur or the layman who helps to organize play is only a detail. Art is necessary; not 'high-brow' art provided from above for the crowd, but art forms created by the crowd.

A Safe, Sane and Beautiful Fourth. "An almost unexplored land of communal play is awaiting those who care to enter as pioneers. The use of colored lights in the open air; the planning at small cost of fountain effects with the fascination of intermittent streams illuminated; or the equal fascination produced by lights coloring clouds of smoke or steam, simply enough generated, these are suggestions for celebrations at night, in the elaboration of which communities could vie with one another, undoubtedly with interesting results. Most effective would be costumed ring dances around these fountains or against the background of ascending colored clouds, dances in which the participants would compete in improvised steps and statuesque grouping. Appropri-

ate tableaux would add to the picturesqueness. In time, too, a literature of simple dramatic content might provide for a still larger participation by the people.

"Contrast the emotion of a crowd sitting through several hours of speeches with the mood of the same group gathered as a family party to watch brothers, sisters, and children in tableaux, pageants, and dancing; a mood which those can best appreciate who have seen an audience of immigrant mothers stirred to their depths by the organized entertainment provided by their children. As for Americanization, the explanations at home concerning costumes and tableaux, followed later by a view of the outdoor performance, certainly would have more promise for the development of emotional overtones of patriotism than that revealed by the average speeches of our politicians and district leaders.

"In these suggestions the community is conceived as a small unit. The village is of course ideal, but in the large cities the school with its parents' association, its playground and its roof garden would be the natural meeting ground for democracy. With holiday play organized along these lines a community's pride would stimulate it to a more beautiful display of imagination than that of 'the Elton Street crowd showing off its bigger band.' If our people cannot learn to organize democratically for larger issues, the lesson of organization might begin quite modestly but

significantly in the planning of holidays which they could succeed in making not only safe and sane, but also gay and beautiful."

The Social Value of Color Appeal. The amount of thought given to color in dress by women is largely biologic in origin. It is fundamentally based on the desire to attract and hold attention, to stimulate interest and desire just as is the evolution of color in birds' plumage, and in flower forms. The military flag is an evidence of the tribal recognition of the value of color symbolism and of the stirring power of a color design blowing in the breeze. As important as the drummer-boy in the old charge was the color-bearer. But between these two extremes of sex allure and military ardor, the social value of color has not been recognized or applied.

Any one not in dire want who has walked on Fifth Avenue in New York on a Spring afternoon has consciously or subconsciously stored up memories which will linger for years. "See Naples and die" is one of the most extreme statements which the recognition of color charm has called forth. If color is so moving why should the city, state and nation not avail themselves of its power to throw about community and national life that glamor which it is in color to evoke.

Color in Recruiting. That man is essentially emotional, and that color, music and pattern of forms impresses him more than mere argument is what even the recruiting agents do not seem to

recognize. Not only uniforms and fluttering banners, but every possible appeal of glowing warmth and richness in colors might well be used as a feature of recruiting work. Here and there a recruiting sergeant seems to realize this in a measure. One instance which came to the author's notice recently was on a New York City bus at Vesey Street and Broadway from the steps of which a soldier harangued the crowd, while up above doing their work quite as effectively for all their silence were two gorgeously raimented Scotch "Ladies from Hell." If color can be utilized in war time to help arouse emotions, it can be used still more beautifully and effectively in times of peace in community celebrations and in community play, to create a group emotion, a common feeling of joy.

The block party is not the only opportunity for converting a city street into a wonderland. Holidays could be celebrated in the Venetian carnival spirit by the hanging of colored rugs from the windows, by outdoor costume dances in the city squares.

Colored Illumination in Holiday Celebrations. With the aid of the new and growing art of color in electric illumination, the lakes, squares, river fronts, bridges and fountains could become the centers of imagination-stirring and mood-compelling effects. Specific suggestions are to be found in the chapter on "Colored Illumination."

But this should be a people's art, the scheme to be worked out by the local color artists and exe-

cuted with the coöperation of the community and the electric light companies. Special movable standard apparatus for controlling and mixing colored lights, varying its intensities and chromas will no doubt be devised and be used to play upon fountains, trees and street pageants, according to slowly evolving and ever enriched ideas of the possibilities of color mood in colored light effects. Even the shopkeepers in communities may some day be organized to coördinate their window and sign lighting towards a composite picture, changeable from time to time; just as building owners have coöperated to transform a whole street by bringing color into the façades.

This may all sound like the dream of an oversanguine art devotee but there is not the slightest doubt that the art of color expression is in its infancy and that the future will see color spectacles on a scale and order of beauty and effectiveness such as would make a Venetian carnival seem a pale tinted candle flame by contrast. Communities will yet vie with one another in the celebration of our nation's holidays, and drab speeches will give way to joy-compelling color.

THE END

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